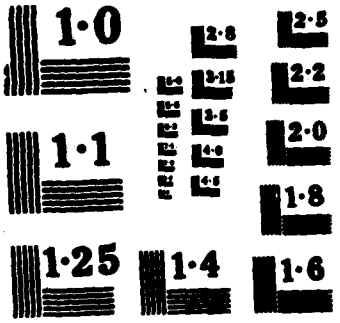

NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

(2)

INSTRUCTION REPORT GL-85-2

PIEZOMETER DATA BASE PACKAGE USER'S GUIDE

by

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DEPARTMENT OF THE ARMY
Waterways Experiment Station, Corps of Engineers
PO Box 631, Vicksburg, Mississippi 39180-0631

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

A data base package for storage, retrieval, and display of piezometer data for geotechnical projects is described. Detailed instructions are given for using the package for monitoring piezometers, rapid retrieval of data, and display of piezometer locations, time history plots, and piezometer readings with embankment profiles. The package provides for easy, interactive data entry and editing with automatic data checks and error messages when data exceed user specified ranges. Data storage and retrieval are accomplished

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using the CE-owned SYSTEM 2000 Data Base Management System on the Corps-wide time-sharing service operated (1984) by Control Data Corporation (CDC). The data entry and retrieval programs developed for the package are designed for a low skill level and minimum training of personnel. Data entry can also be accomplished on CE District Harris computers.

Keywords:
CAGE (Computer Applications in Geotechnical Engineering).

PREFACE

This user's manual describes the use of the data base package for piezometer data. The package is a product of the Computer Applications in Geotechnical Engineering (CAGE) Project of the Office, Chief of Engineers (OCE), US Army Corps of Engineers.

Criteria for the Piezometer Data Package were developed by the CAGE Instrumentation Task Group composed of the following members:

Mr. Russ Fondelier, Chairman, Ohio River Division
Mr. Marshall Fausold, Pittsburgh District
Mr. Bernie Hargrave, Seattle District
Mr. David Lytle, St. Louis District
Mr. Tom Plummer, Huntington District
Mr. Steve Stockton, Portland District
Mr. David Wright, Southwest Division
Mr. Richard Davidson, OCE
Mr. Richard Malm, OCE
Mr. Earl Edris, Jr., Waterways Experiment Station (WES)
Mrs. Wipawi Vanadit-Ellis, WES

The data base design was developed by Mr. Earl Edris, Jr., Soil Mechanics Division (SMD), Geotechnical Laboratory (GL), WES, project engineer for the package, and Mrs. Wipawi Vanadit-Ellis, SMD, GL, WES. Software was developed by Dr. Darrell Ward and Mr. John W. Meux through the North Texas State University Computer Science Department. The data entry program was converted for use on District Harris computers by Mr. Jack Cicone, Automatic Data Processing Center, Pittsburgh District. Graphics programs were written by Messrs. Larry Mann, SMD, GL, Arden P. Park, SMD, John Palmerton, Engineering Geology and Rock Mechanics Division (EGRMD), GL, and Ms. Mary Jane Gilmer, EGRMD. The initial application of this package was by the Pittsburgh District. Mr. Tom Churilla, Geotechnical Branch, Pittsburgh District, supervised Messrs. Paul Vandebunt and Kurt Hallbert, who exercised the package and provided valuable user input to improve the programs. This report was prepared by Mr. Edris and Mrs. Vanadit-Ellis.

The CAGE project principal investigator was Mr. William E. Strohm, Jr. (EGRMD). CAGE project work is directed by a Policy Management Group composed of the following: Messrs. Paul Fisher, Chief, Geology Section, Geotechnical and Civil Branch (GCB), OCE (DAEN-ECE-G), Chairman; Richard Davidson, Chief, Soil Mechanics Section, GCB, OCE: Richard Malm, Chief, Computation and

Analysis Section, Engineering Support Branch, OCE (DAEN-ECE-S); Samuel Gillespie, Engineer, GCB, OCE: LeRoy McAnear, Chief, SMD, WES Program Manager, CW R&D Program, Materials-Soils (replaced by Mr. David P. Hammer, Chief, Geotechnical Section, Engineering Division, Ohio River Division in June 1984); Dr. Don C. Banks, Chief, EGRMD, WES Program Manager, CW R&D Program, Materials-Rock; and Mr. Strohm, Principal Investigator, CAGE. This investigation was carried out under the general supervision of Dr. William F. Marcuson III, Chief, GL. This report was edited by Ms. Odell F. Allen, Publications and Graphic Arts Division.

COL Allen F. Grum, USA, was Director of WES. Technical Director was Dr. Robert W. Whalin.

CONTENTS

CONVERSION FACTORS, NON-SI TO SI (METRIC) UNITS OF MEASUREMENT

Non-SI units of measurement used in this manual can be converted to SI (metric) units as follows:

Multiply	By	To Obtain
cubic feet	0.02831685	cubic metres
feet	0.7645549	metres
gallons (US liquid)	3.785412	cubic decimetres
inches	0.3048	centimetres
pounds (force) per square inch	6.894757	kilopascals
pounds (mass) per cubic foot	16.01846	kilopascals per cubic metre

PIEZOMETER DATA BASE PACKAGE USER'S GUIDE

PART I: INTRODUCTION

Purpose

1. This report provides a description and instructions for use of the piezometer data base package developed by the Computer Applications in Geotechnical Engineering (CAGE) project. The report is written for the piezometer data base user and is not intended to replace the computer operating system or the Intel (System 2000) data base user's manual.

Basic Definitions

2. A data base is defined as pieces or groups of data stored together in an orderly form such that access to all or any part of the data can be readily accomplished. Data manually stored in a filing cabinet could be classified as a simple form of a data base. A computerized data base is one that utilizes a computer and associated hardware for data entry, storage, and access. A data base system includes, in addition to the data base itself, all peripheral software that enables the data not only to be quickly and orderly stored, but also accessed in any form desired and manipulated or analyzed by whatever means are most useful to the user. A data base system can therefore be categorized as an engineering tool. It can, if properly utilized, be a powerful tool that greatly enhances the usefulness and value of the data.

3. More specifically, the piezometer data base package is a computerized system that provides for the orderly storage, retrieval, and analysis of piezometric data resulting from construction or routine monitoring of these instruments. These data are used to determine the inferred performance of the structures. The data base provides the flexibility to look at the data in various forms so that an adequate performance evaluation can be made. As most piezometer data are evaluated in a graphical format, proper use of the data base package described herein can reduce the tedious task of graphical preparation and can provide a more effective and timely evaluation procedure.

Also, the use of this type of data base package can be very helpful in satisfying reporting requirements, assuring project integrity, and providing a tool for management of piezometer reading personnel.

Background

4. The need for the use of data base management systems in geotechnical engineering was identified by Hammer and Bennett (1979). In particular, the need for an instrumentation data base was found to be a high priority item. The criteria for this package were developed by the CAGE instrumentation task group that consisted of Division and District personnel. The criteria report describes the general requirements in terms of the user's need for an instrumentation data base management system. Those requirements for the package design are as follows:

a. The package must be suitable for general use throughout the Corps.

b. Data entry should be user friendly so that data can be entered by nonprogrammer or subprofessional level employees.

c. Anomalous data should be flagged for further investigation or action using user-defined threshold or range of minimum-maximum values.

d. The design should allow for easy access to determine the inferred performance of the structures.

e. Graphic programs should be included to present data in various forms.

f. Drafting preparation time for both evaluation procedures and reporting requirements should be minimized.

Another aspect of the criteria report was the use of the data base as a management tool. The requirements for this need are as follows:

g. A check should be made to determine whether readings are being taken as scheduled.

h. Inoperative instruments should be listed.

i. Date of last readings for all instruments should be recorded.

j. Remarks to clarify questionable readings should be listed.

5. The envisioned instrumentation data base package will be usable with six basic types of instruments. Instead of developing one large data base, CAGE decided to develop a series of smaller data bases for each of the various instruments. This procedure is more economical for the user who is dealing

with only one or a few types of instruments. This report will deal with piezometer data, a high priority among the instrumentation series. The rest of the series consists of the following systems:

a. Carlson pressure meters.

b. Strain gages.

c. Settlement points.

d. Surface movements.

e. Inclinometers.

6. The criteria report was completed in July 1981, with work on the package beginning at that time. The piezometer data base was put in use at the Pittsburgh District as a pilot project in May 1982. There the system was refined and made more user oriented.

Applications

7. The package will accomplish the following:

a. Use a simple question-answer type data entry, usable by personnel with very little training required.

b. Provide data reduction based on type of piezometer and user specification of appropriate calibration values.

c. Provide for recording reservoir/pool levels.

d. Compare data with preset values or ranges and issue appropriate warnings or alerts.

e. Convert 90-deg V-notch weir readings from cubic feet* per second to gallons per minute.

f. Recall, display, and analyze data as soon as loaded to data base.

g. Provide graphic plots for reading versus time curves, cross section plots, plan maps of location, and contours of water levels.

h. Evaluate and compare past and present performance data.

i. Meet requirements for management tools as listed in paragraph 4.

System Requirement

8. In order to use this data base package, the District/project must have a means of accessing the programs which presently reside on a Control

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* A table of factors for converting non-SI units of measurement to SI (metric) units is given on page 4.

Data Corporation (CDC) mainframe computer. All Corps of Engineer Districts have access to this computer system through Corps-wide Teleprocessor Services Program (TSP) contract. To access the computer to enter data, the project office needs to have use of a time-sharing terminal with the necessary equipment to transmit data over telephone lines. The type of terminal the District or project has determines the quality of the graphic displays. Any type of terminal can be used for data entry and retrieval or report summaries.

9. The number of people who should be trained to use this data base package is determined by the number of piezometers and needs in the District. If data entry is centralized, one or two District personnel are needed to enter and retrieve data. Ideally, data would be entered at the project office and loaded to the data base at the District office. Retrieval of data can be accomplished at the project or District office. It is desirable that several engineering personnel be familiar with the package. The data collection program was designed so that personnel not familiar with computers can input data. Retrieving data and preparing plots require some knowledge of the storage system command language. Training District/project personnel to use the data base system, usually a three-day process, is accomplished by CAGE project personnel who will visit the District/ project site.

10. To implement the piezometer data base, the District/project personnel need to contact the CAGE project personnel at WES. A meeting will be arranged to discuss details of the package and how it relates to the user's needs. The CAGE personnel will set up the data base in the user's CDC account, transfer other associated programs presented in this report, along with training personnel in the use of the package.

11. The project cost to use the data base system will depend upon how much data are entered and how the District uses the system for data retrieval. The costs for various examples in Parts III and IV are shown to provide an indication of the total operating costs.

Report Organization

12. The remainder of this report is broken into three parts. Part II describes the data base structure and lists the various data elements. Part III explains the various procedures to enter data to the system.

Part IV describes the methods to obtain data from the system. Appendix A describes the procedure for backing up the piezometer data base. The use of the CDC text editor is described in Appendix B.

PART II: DATA STORAGE SCHEME

Data Base Structure

13. The piezometer data base uses System 2000 (trademark of Intel Systems Corporation) as the data base management system (DBMS) and storage software. This system is available to all CE Districts on the CDC mainframe computer. System 2000 (S2K) is a hierarchical or tree-type DBMS where data are grouped into functional units at each level, and each level has a direct relationship to the data appearing above and below that level. A schematic of the data base structure is shown in Figure 1.

14. The data base structure is set up to resemble the field situation where there are a number of piezometers for every project with multiple readings for each piezometer. At the top of the data structure (level CØ in Figure 1) is the project information. This level contains the data describing the project(s) such as location, type of structure, maximum and minimum pool elevation, tailwater elevation, and important construction dates. Below that level (C4Ø in Figure 1) is the piezometer information level which consists of the number or name of the piezometers, the location, top of riser elevation, threshold values, and other specific information about the piezometer. Any of this information may be irrelevant to the user and ignored. However, the threshold values are more than just stored data values; they can be used for a quick data check and for issuing appropriate warnings. If the readings exceed the established threshold values, the warning message would be as follows:

1st threshold - "Check the reading"
2nd threshold - "Reread the piezometer"
3rd threshold - "Check the piezometer"
4th threshold - "Notify District/project engineer"

The threshold messages can be modified to meet user needs by changing the wording of the warning message (e.g., 1st threshold - "Check reading and call District if correct"). The last level (C9Ø in Figure 1) is the reading level which consists of readings, dates, method used to obtain reading, and any comment or remarks about the reading. The project data are entered once for each project while the piezometer data are entered for each instrument. There will be many piezometers associated with one project and many readings associated with one piezometer.

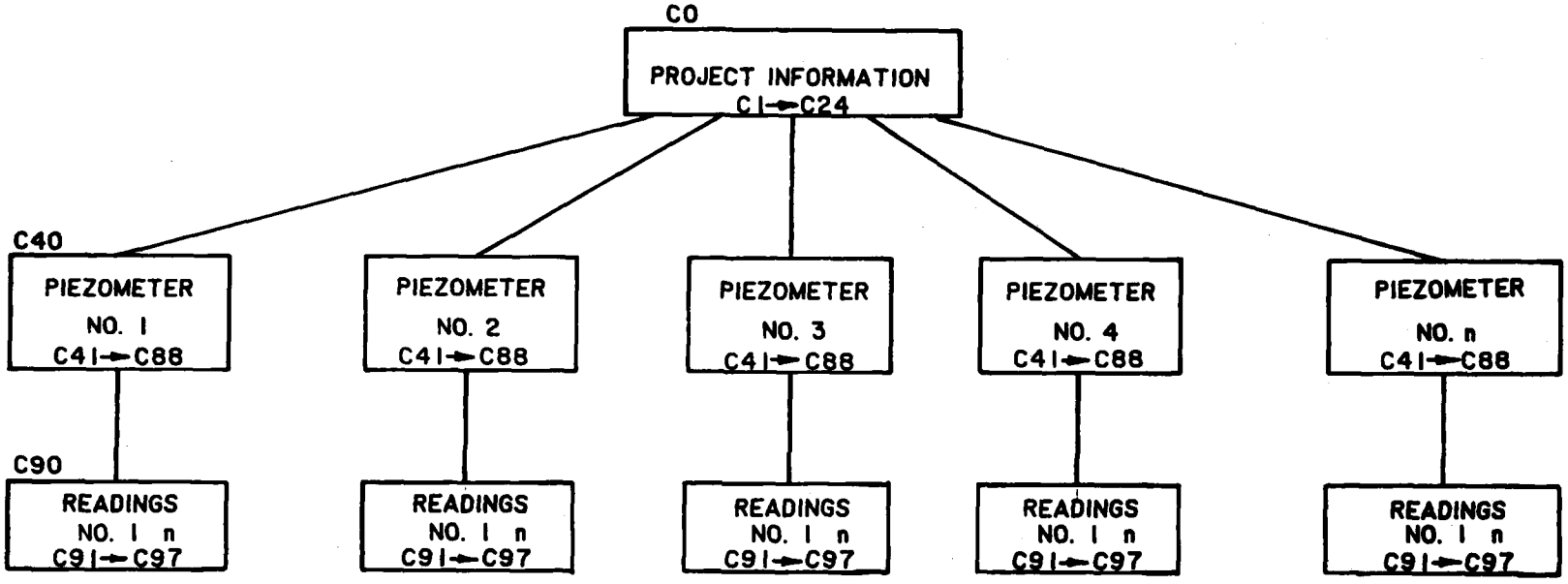

Figure 1. Schematic of the data base structure showing component number in Table 1

Definition of Data Elements

15. Within each repeating group or level of the data base, there are individual data elements which have names, abbreviations, component numbers, and other attributes identifying the type of data that will be retained. These other attributes of the data elements are an indication of how the data element is stored and used within the system, the data type, and the field size. Each data element is stored within the data base as either KEY or NON-KEY, depending on how the element will be used. If the data element is not to be used to define data groups, the element is designated as a NON-KEY element. However, if the element will be used to define specific groups of data for analysis, the element is designated as a KEY element. Examples will be shown in Part IV. All the data elements within the system fall within one of the following four types: NAME consists of any combination of letters or numbers and will be treated as text material; DATE consists of a fixed format for month, day, and year; and two types of numeric data, DECIMAL (allows a decimal point) and INTEGER (does not allow a decimal point). The field size is the maximum number of characters that can be stored for a particular element. The data elements and their attributes are listed in Table 1. The component numbers from Table 1 are shown on the schematic of the data base structure in Figure 1.

16. Examples for selected data elements are shown in Table 2. Units such as mean sea level (msl), feet, or pounds per square inch (psi) are not entered or stored. Thus, units for numerical values need to be known and should be listed with the data elements on a readily available reference sheet. Another important item is the need for unique piezometer names for each project. The same instrument name can be used for different projects but not within the same project.

Uses of Stored Data

17. The main advantage of the piezometer data base package is the rapid retrieval and graphical display of specific information or readings. The package provides the following additional advantages:

a. Provides an efficient organized system for monitoring piezometers required for dam safety evaluations.

Table 1

Definition of Data Elements

Component Number	Element Abbreviation	Element Description	KEY/NON-KEY Designation	Type of Data	Field Size
C1	PROJ-NAME	Project-Name	Key	NAME	30 characters
C2	PROJ-RIVER	Project-River	Non-Key	NAME	30 characters
C3	PROJ-STATE	Project-State	Non-Key	NAME	5 characters
C4	PROJ-TOWN	Project-Town	Non-Key	NAME	20 characters
C5	DIST	District	Non-Key	NAME	5 characters
C6	TYP-STRT	Type of Structure	Non-Key	NAME	20 characters
C7	CRT	Crest Elevation	Non-Key	DECIMAL	5 digits
C8	SPY	Spillway Elevation	Non-Key	DECIMAL	5 digits
C10	MXPL	Maximum Pool Elevation	Non-Key	DECIMAL	5 digits
C11	MNPL	Minimum Pool Elevation	Non-Key	DECIMAL	5 digits
C12	NRPL	Normal Pool Elevation	Non-Key	DECIMAL	5 digits
C13	NXTW	Maximum Tailwater Elevation	Non-Key	DECIMAL	5 digits
C14	MNTW	Minimum Tailwater Elevation	Non-Key	DECIMAL	5 digits
C15	NRTW	Normal Tailwater Elevation	Non-Key	DECIMAL	5 digits
C18	RECPL	Pool of Record	Non-Key	DECIMAL	5 digits
C19	DRPL	Date of Record Pool	Non-Key	DATE	10 characters
C20	ALTPL	Alert Pool	Non-Key	DECIMAL	5 digits
C22	CONT-BEG	Date Construction Began	Non-Key	DATE	10 characters
C24	CONT-COM	Date Construction Completed	Non-Key	DATE	10 characters
C40	PIEZ	Repeating Group for Piezometers			
C41	PNO	Piezometer Number	Key	NAME	10 characters
C43	PFD	Feature Description	Key	NAME	10 characters
C45	PSTA	Station (dam station)	Key	NAME	8 characters
C47	POFF	Offset (lock station)	Key	NAME	8 characters
C49	TIPEL	Tip Elevation	Key	DECIMAL	5 digits
C51	TREL	Top of Riser Elevation	Key	DECIMAL	5 digits
C53	PGS	Ground Surface Elevation	Key	DECIMAL	5 digits
C55	RPD	Riser Pipe Diameter	Non-Key	DECIMAL	4 digits
C57	TPSL	Soil Type at Tip	Key	NAME	7 characters

(Continued)

Table 1 (Concluded)

Component Number	Element Abbreviation	Element Description	KEY/NON-KEY Designation	Type of Data	Field Size
C59	TYPIEZ	Type of Piezometer	Key	NAME	20 characters
C61	PSAT	Status of Piezometer	Key	NAME	10 characters
C63	PDI	Date of Installation	Key	DATE	10 characters
C65	LOCINT	Location of Installation Report	Non-Key	NAME	10 characters
C67	PMIT	Method of Installation	Non-Key	NAME	25 characters
C68	PIB	Installed By	Non-Key	NAME	15 characters
C69	PTEST	Method of Testing Piezometer	Non-Key	NAME	15 characters
C70	REFD	Reference Drawing	Non-Key	NAME	20 characters
C71	CALB	Calibration Constant	Non-Key	DECIMAL	4 digits
C73	FLTMAT	Filter Material	Non-Key	NAME	15 characters
C74	TPFLT	Top Elevation of Filter	Non-Key	DECIMAL	5 digits
C75	BTFLD	Bottom Elevation of Filter	Non-Key	DECIMAL	5 digits
C76	SALMAT	Seal Material	Non-Key	NAME	15 characters
C77	TPSEAL	Top Elevation of Seal	Non-Key	DECIMAL	5 digits
C78	BTSEAL	Bottom Elevation of Seal	Non-Key	DECIMAL	5 digits
C81	PDTLR	Date Last Reading	Key	DATE	10 characters
C82	PDTNR	Date Next Reading	Key	DATE	10 characters
C83	PINT	Interval Between Readings	Key	NAME	10 characters
C85	PTH1	1st Threshold Value (reread piez)	Key	DECIMAL	5 digits
C86	PTH2	2nd Threshold Value (send warning to dist & project)	Key	DECIMAL	5 digits
C87	PTH3	3rd Threshold Value (reading above alert pool level)	Key	DECIMAL	5 digits
C88	PTH4	4th Threshold Value (reading above ground surface)	Key	DECIMAL	5 digits
C90	PRED	Repeating Group for Piez Readings			
C91	PDTRD	Date of Reading	Key	DATE	10 characters
C93	PREAD	Reading (elevation)	Key	DECIMAL	5 digits
C95	PMDRD	Method of Obtaining Reading	Key	NAME	15 characters
C97	PRM	Remarks	Key	NAME	20 characters

Table 2

Examples for Selected Data Elements

Component Number	Element Abbreviation	Description	Examples	Remarks
C1	PROJ-NAME	Project Name	MICHAEL KIRWAN TIONESTA LAKE L&D No. 1 Red River	Any name up to 30 characters and spaces
C41	PNO	Piezometer Number	70-C-1 78-T-1 POOL PRECIP. T.W. Weir	Any 10-character name for piezometer, water level, or weather readings
C45	PSTA	Station	100+00 200.50	Any 8-character name that will locate one coordinate of the instrument
C47	POFF	Offset	200 U/S 50 D/S 100.25	Any 8-character name that will locate other coordinate of the instrument
C49	TIPEL	Tip Elevation	275.4	Elevation required for calculation of air actuated piezometer readings
C51	TREL	Top of Riser Elevation	301.5	Elevation required for calculation of open standpipe, uplift cell, gauge pressure, and staff readings
C55	RPD	Riser Pipe Diameter	1.375 1.25	Inside diameter of riser pipe expressed as a decimal
C59	TYPIEZ	Type of Piezometer	Open Standpipe Pneumatic Sump Weir POOL PRECIP.	A 20-character name that is used to describe the piezometer type and is used to select the reduction procedure for field data.

(Continued)

Table 2 (Concluded)

Component Number	Element Abbreviation	Description	Examples	Remarks
C71	CALB	Calibration Constant	51.3	Used for 90° V-notch weir calculations
C81	PDTLR	Date Last Reading	5/12/84	Any valid date. These must be updated by the user
C82	PDTNR	Date Next Reading	6/12/84	
C83	PINT	Interval Between Readings	2 months 40 days Nt spring (next spring) Nt high wt (next high water)	Any 10-character description of the time between readings or when next reading should be
C95	PMDRD	Method of Obtaining Reading	Weighted line Electric Probe TAPE Probe Gauge #2350	Any 15-character description of device used to make the reading.

b. Eliminates time-consuming summarizations of data for periodic inspections.

c. Provides an organized system for management of reading schedules and piezometer status.

d. Allows rapid data reduction and flags readings outside user specified limits.

e. Provides time-history plots and cross-section plots with piezometer readings for geologic and soils studies.

PART III: DATA INPUT

General

18. There are two procedures available to the user for entering data to the data base. The procedure which will be described in this section entails using a data entry program that generates a data file which is loaded to the data base at the user's convenience. This program uses a question-answer type format to collect the data. To allow any data currently digitized on a computer file to be loaded to this data base system, a card format type of data file was developed. Thus, by reformatting the data into the format shown in Table 3, the load procedure described later in this section can be utilized. The second procedure is to update or modify the data by direct access to the data base files while the user is working on line with the data base. This procedure will be described in a section of Part IV, "Interactive Data Modification." This method is more costly when compared to the first procedure which only accesses the data base when the data is being loaded.

Data Entry Program - Using a Data File

Description

19. This data entry procedure consists of two programs. The first program is designed to collect raw data and build a data file that will be properly loaded into the data base when the second program is executed. The data entry or first program operates on a time-sharing basis in a conversational mode. A version of the data entry program is available on the Harris computer. The data file generated must be transferred to the CDC computer because the data base must reside on this mainframe. The data entry program prompts the user for the data on an item by item basis, starting at the project information level and proceeding to all lower levels. After each prompt, the computer waits for a carriage return before proceeding. Once the user becomes familiar with the entry questions, a short prompt (up to six characters each) option is available to save the time required to print the long prompts. The prompts used to request each item are contained in a separate driver file (DRVPIZ) that the entry program accesses (shown in Table 4). By having this separate file, users can modify the prompts for their particular

Table 3

Data Card Format

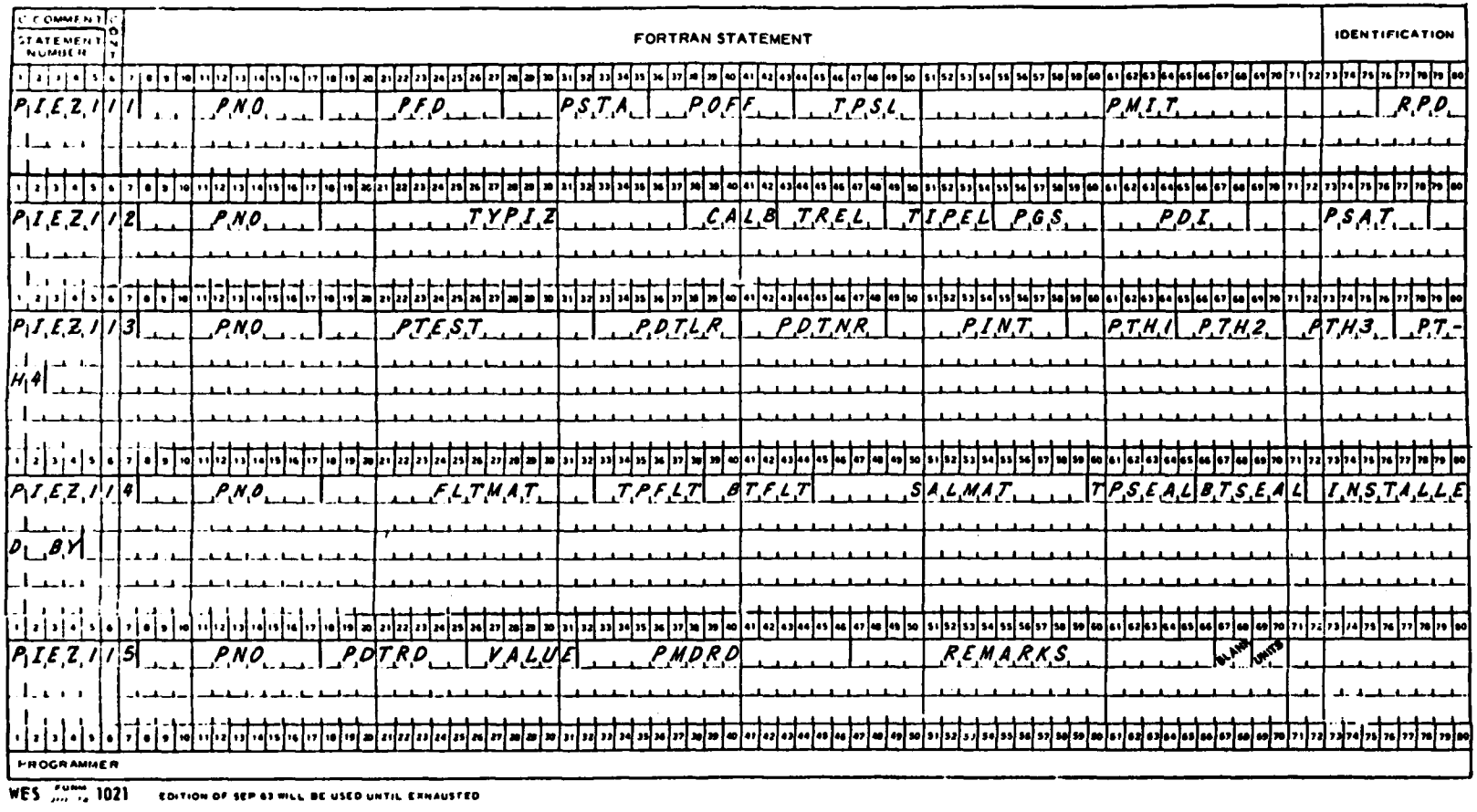

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Table 4

Prompts for Requested Information in Data Entry Program

Project Information	PROJECT NAME(INPUT END TO QUIT)?
	PRNAME
	PROJECT RIVER? *long prompt*
	PRIVER
	PROJECT STATE?
	PSTATE *short prompt*
	PROJECT TOWN?
	TOWN
	DISTRICT?
	DIST
	TYPE OF STRUCTURE?
	TYPEST
	CREST ELEVATION?
	CRELEV
	SPILLWAY ELEVATION?
	SPELEV
	MAXIMUM POOL ELEVATION?
	MXELEV
	MINIMUM POOL ELEVATION?
	MNELEV
	NORMAL POOL ELEVATION?
	NORMEL
	MAXIMUM TAILWATER ELEVATION?
	MXTWEL
	MINIMUM TAILWATER ELEVATION?
	MNTWEL
	NORMAL TAILWATER ELEVATION?
	NOTWEL
	POOL OF RECORD?
	POOL
	DATE OF POOL RECORD?(MM/DD/YY)
	POOLDT
	ALERT POOL?
	ALERTP
	DATE CONSTRUCTION BEGAN?(MM/DD/YY)
	CONSTRT
	DATE CONSTRUCTION COMPLETED?(MM/DD/YY)
	CONFIN

(Continued)

(Sheet 1 of 3)

Table 4 (Continued)

	PIEZOMETER OR GAUGE NUMBER?
	PIZNM
	FEATURE DESCRIPTION?(10 CHAR. MAX)
	FEATRE
	STATION?(8 CHAR. MAX)
	STAT
	OFFSET OR STATION?(8 CHAR. MAX)
	OFFSET
	PIEZOMETER TIP ELEVATION?
	TIPEL
	TOP OF RISER OR GAUGE ELEVATION?
	TOR
	GROUND SURFACE ELEVATION?
	GSE
	RISER PIPE DIAMETER?
	RPD
	SOIL TYPE AT TIP?(7 CHAR. MAX)
	SOILTY
	TYPE OF PIEZOMETER?(20 CHAR. MAX)
	PIZTYP
	STATUS OF PIEZOMETER?(10 CHAR. MAX)
	PZSTAT
	DATE OF INSTALLATION?(MM/DD/YY)
	DOINS
Piezometer	LOCATION OF INSTALLATION REPORT?(10 CHAR. MAX)
Information	REPLOC
	METHOD OF INSTALLATION?(25 CHAR. MAX)
	METHOD
	INSTALLED BY?(15 CHAR. MAX)
	BY
	METHOD OF TESTING?(15 CHAR. MAX)
	METHOD
	REFERENCE DRAWING? (20 CHAR. MAX.)
	REFDRW
	CALIBRATION CONSTANT?
	CALCON
	FILTER MATERIAL?(15 CHAR. MAX)
	FILMAT
	TOP ELEVATION OF FILTER?
	TOPEL
	BOTTOM ELEVATION OF FILTER?
	BOTEL
	SEAL MATERIAL?(15 CHAR. MAX)
	SEAL
	TOP ELEVATION OF SEAL?
	TOPELS
	BOTTOM ELEVATION OF SEAL?
	BOTELS
	DATE OF LAST READING?(MM/DD/YY)
	READDT

(Continued)

(Sheet 2 of 3)

Table 4 (Concluded)

	DATE OF NEXT READING?(MM/DD/YY)
	NXTRDG
	INTERVAL BETWEEN READING?(10 CHAR. MAX)
	NTRVL
	1ST THRESHOLD VALUE?
	THRSH1
	2ND THRESHOLD VALUE?
	THRSH2
	3RD THRESHOLD VALUE?
	THRSH3
	4TH THRESHOLD VALUE?
	THRSH4
	DATE OF READING(INPUT 11/11/99 TO QUIT)(MM/DD/YY)
	RDGDAT
	READING VALUE?
Reading	RDGVAL
Group	METHOD OF READING?(15 CHAR. MAX)
	RDGMET
	REMARKS?(20 CHAR. MAX)
	REMARK

(Sheet 3 of 3)

District without affecting the data entry program. After a series of ten items have been entered, the data will be automatically listed for the user to check. Any changes can be made at this time by following instructions that are printed with the listed data. Once the user agrees that all the items are correct, more data can be entered. If a mistake is found at some later time, the user will not be able to go back and make the correction while using the data entry program. The user will have to change the value using the modify procedure during another data entry session, change the formatted data file (not recommended), or follow the CHANGE procedure described in the next section.

20. The data entry program contains some editing capabilities in addition to allowing the user to change the input values. Besides the prompts, the information in Table 5 is contained in the driver file that the data entry program accesses. The first column indicates the type of data item. The following chart shows the numeric definition of the different data types:

Type 1 --- Integer number
Type 2 --- Decimal number
Type 3 --- Character name
Type 4 --- Date

The second column indicates the length of the variable. The number of 10-letter computer words is shown for character and date items, while the number of digits is shown for numeric items. The next two columns contain the minimum and maximum values of numeric data items. If both values are zero, the item will not be checked; however, if one value is nonzero, the data are checked to ensure that the input value is within the minimum-maximum range. If the entered value is outside the range, the program will print the following message and will prompt the user for the same data item again:

(entered value) IS NOT WITHIN THE LIMITS: [(minimum, maximum)].

The ranges should be set up when the system is initiated; however, the values can be changed when needed. The next columns in the file contain the data base name of the item. The last column is the maximum number of characters for each character and date element. Using this information, the program knows the type of data, the size, and a range for numeric values; thus, any large errors (wrong data type or shifts in the decimal point) are caught and the user is required to enter corrected values before the program continues.

Table 5

Data Element Specifications

Type	Length	Limits		Name	Number of Characters
		Min.	Max.		
3	3	0.	0.	PROJ-NAME	30
3	3	0.	0.	PROJ-RIVER	30
3	1	0.	0.	PROJ-STATE	5
3	2	0.	0.	PROJ-TOWN	20
3	1	0.	0.	DIST	5
3	2	0.	0.	TYP-STRT	20
2	6	990.	1210.	CRT	
2	6	0.	0.	SPY	
2	6	980.	1020.	MXPL	
2	6	930.	960.	MNPL	
2	6	940.	990.	NRPL	
2	6	900.	955.	MXTW	
2	6	880.	940.	MNTW	
2	6	0.	0.	NRTW	
2	6	980.	1100.	RECPL	
4	1	0.	0.	DRPL	
2	6	0.	0.	ALTPL	
4	1	0.	0.	CONT-BEG	
4	1	0.	0.	CONT-COM	
3	1	0.	0.	PNO	7
3	1	0.	0.	PFD	10
3	1	0.	0.	PSTA	8
3	1	0.	0.	POFF	8
2	6	800.	1000.	TIPEL	
2	6	900.	1030.	TREL	
2	6	900.	1100.	PGS	
2	5	0.	2.	RFD	
3	1	0.	0.	TPSL	7
3	2	0.	0.	TYPIEZ	20
3	1	0.	0.	PSAT	10
4	1	0.	0.	PDI	
3	1	0.	0.	LOCINT	10
3	3	0.	0.	PMIT	25
3	2	0.	0.	PIB	15
3	2	0.	0.	PTEST	15
3	2	0.	0.	REFD	20
2	5	0.	100.	CALB	
3	2	0.	0.	FLTMAT	15
2	6	0.	0.	TPFLT	

(Continued)

Table 5 (Concluded)

Type	Length	Limits		Name	Number of Characters
		Min.	Max.		
2	6	0.	0.	BTFLT	
3	2	0.	0.	SALMAT	15
2	6	0.	0.	TPSEAL	
2	6	0.	0.	BTSEAL	
4	1	0.	0.	PDTLR	
4	1	0.	0.	PDTNR	
3	1	0.	0.	PINT	10
2	6	850.	1100.	PTH1	
2	6	850.	1100.	PTH2	
2	6	850.	1100.	PTH3	
2	6	850.	1100.	PTH4	
4	1	0.	0.	PDTRD	
2	6	0.	0.	PREAD	
3	2	0.	0.	PMDRD	15
3	2	0.	0.	REMARKS	20

Key for Type Codes
1-Integer
2-Decimal
3-Character
4-Date

The user can modify the prompts, the range values, or the order of the prompts by using an editor. The data element names must not be changed, since they are used in loading data to the data base.

21. The user should be aware of the following cautions for use of this procedure:

a. Data should always be entered with no leading blanks. Do not use a colon ":" in any input because the characters following the colon will not be stored by System 2000.

b. The collection program checks project names and piezometer numbers that were previously entered. However, if a new value is entered incorrectly, the incorrect number will be stored in the data base unless it is corrected before loading to the data base.

c. The following error messages are generated by the data collection program as a result of its internal editing:

```
OOPS!  NOT A VALID INTEGER, TRY AGAIN
OOPS!  NOT A VALID REAL, TRY AGAIN
OOPS!  NOT A VALID DATE, TRY AGAIN
```

The collection program also checks the input format for dates and that values for days do not exceed 31 and for month, does not exceed 12.

d. In the collection program, all data entered is printed back to the user for editing except for the piezometer number. If this number is entered incorrectly, the best way to change the number is to edit the data file before loading the data to the data base.

Accessing and operation of the collection program

22. To access the data entry program the following commands are used:

```
GET, INPPIZ  (for INPUT piezometer)
CALL, INPPIZ
```

or simply

```
-INPPIZ
```

The collect program creates a data file called DATPIZ. On the Harris computer, the same command without the "-" is used.

23. The schematic of the collection program (Figure 2) illustrates how the system works. The first question the system asks the user is "Do you want shortened prompts?" The answer to this question will determine which prompts, the full length or the short ones with a maximum six characters, are used for the current session of the collection program. The user should be well acquainted with the program before using the shortened prompts option. The next

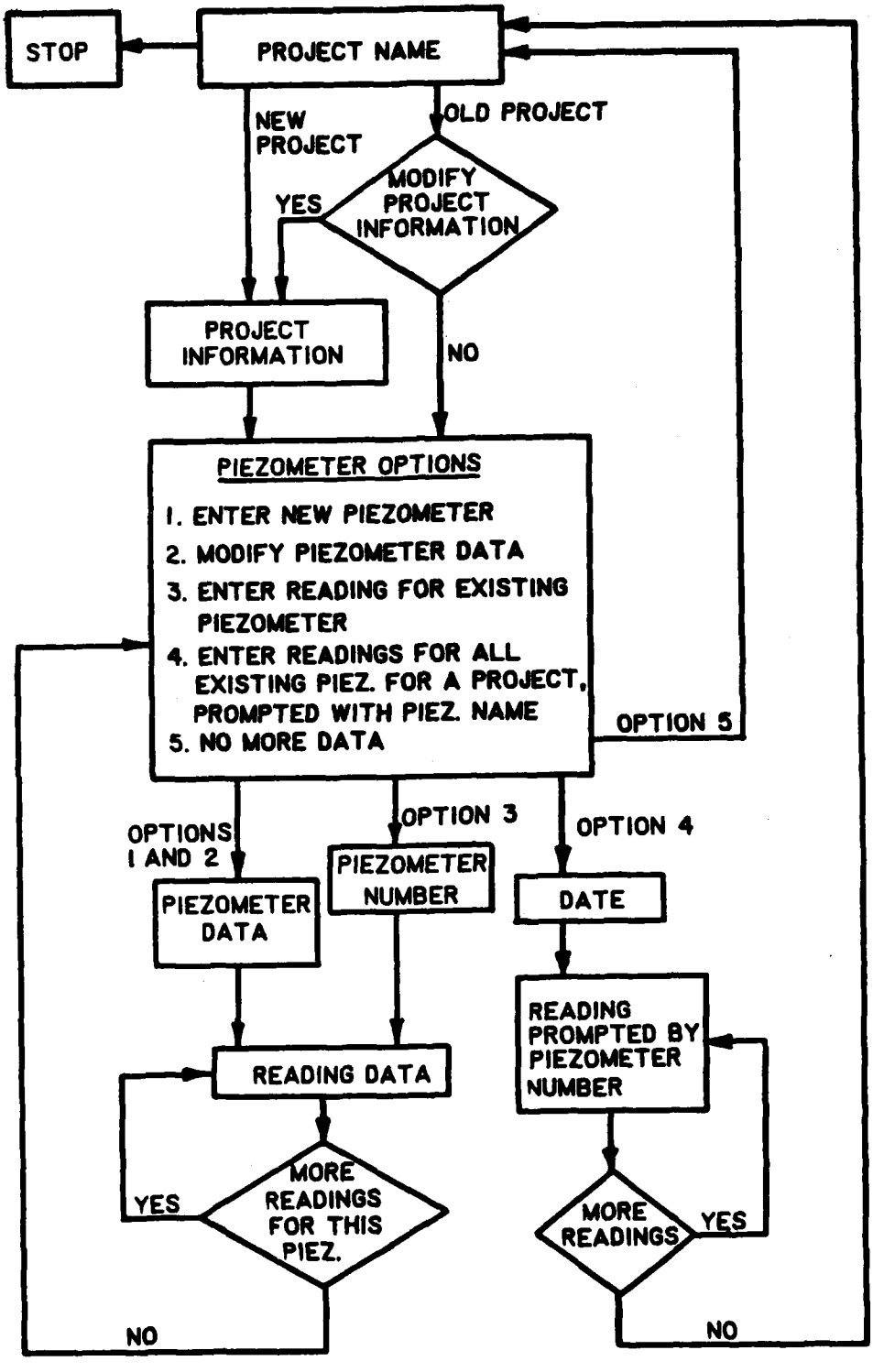


Figure 2. Schematic for piezometer collect program

question is the prompt for project name. After a carriage return, it will ask if this is a new or old project. At this point a file PZPRFL (PIEZOMETER PROJECT FILE) is accessed. This file contains a listing of all the current project names. It does an inventory of the project name to confirm that the entered name is either a new or an old project. If it disagrees with the user's answer, it will respond with either "PROJECT X ALREADY EXISTS, TRY AGAIN" or "PROJECT X DOES NOT EXIST, TRY AGAIN" and prompts the user for the project name again. This checking is done to avoid problems such as duplication of names or misspelled name. Duplication of project names can cause problems with the attachment of wrong piezometers to a project. The System 2000 command language checks the entire name against the stored names, thus requiring precise spelling. For a new project, the user will have the following options:

1. USE THE DEFAULT PROMPT SEQUENCE
2. CREATE MY PROMPT SEQUENCE
3. USE THE TAILORED PROMPT SEQUENCE
4. KEEP THE CURRENT PROMPT SEQUENCE

Option 1 will prompt the user for all components 1 through 24.

Option 2 will let the user generate a specific prompt sequence. This option will allow the user to be prompted in whatever order the data appears on the data forms. If this sequence is saved, it will replace the previous tailored prompts sequence in option 3. If more than one project is being entered during the same session, the prompt sequence will be the current prompt sequence (option 4) for the next project. The complete listing of the prompts is available if required.

Option 3 is the tailored sequence saved in option 2.

Option 4 is the tailored sequence created in option 2.

Different options will be used throughout the examples shown later in this section. For an old project, the program will allow the user to edit or modify the project data that already exist in the data base by reentering the values to be changed. The options listed above are available for modifying data.

24. The next series of prompts are for piezometer information. The options for this level are as follows:

1. INPUT NEW INSTRUMENT
2. MODIFY EXISTING INSTRUMENT/DATA VALUES

3. INPUT READING VALUES
4. BE PROMPTED FOR SETS OF READINGS
5. NO MORE INSTRUMENTS TO ENTER

Options 1, 2, 3, and 4 access the file PZFL (PIEZOMETER FILE) which contains a listing of all the piezometer names and types. A list of the various piezometer types is shown in paragraph 26. PZFL is the check list for piezometer names like the project check list, PZPRFL. These files are automatically updated when a new project or piezometer is entered. Option 1 checks file PZFL to ensure that duplicate piezometer names are not entered for the same project, and options 2 and 3 check PZFL to ensure that the piezometer name exists. Options 1 and 2 provide for the entering or modifying of piezometer instrument data (components 41 through 88). For these two options, the user will be presented with the four prompt choices described in paragraph 23. After piezometer information is entered, the program will prompt for reading values as done in option 3 which will prompt the user for the reading information (components 91 through 97). With option 3, several readings can be entered for one piezometer. Option 4 provides for the entry on one reading for all piezometers associated with a project. Option 4 accesses the file PZFL for the appropriate piezometer numbers. This option is very convenient if the user needs to update all the piezometers for one reading date. Option 5 should be selected when a user has finished inputting data for that project. The user can then either continue on to another project and repeat the process or terminate the data entry program.

25. The procedure used to reduce the raw piezometer data is based on the type of piezometer. If the type of piezometer is not present in the PZFL file, or is not one of the values shown in paragraph 26, the following options will be presented for data reduction:

FOR THESE PIEZOMETER READINGS ARE YOU ENTERING
1. ELEVATION VALUES
2. DEPTH VALUES FROM TOP OF RISER IN FT
3. PIEZ. TIP GAUGE PRESSURE PSI VALUES
4. U. P. GAUGE PRESSURE PSI VALUES
5. OTHER TYPE GAUGE PRESSURE PSI VALUES
6. WATER LEVEL GAUGE READING IN FEET
7. PNEUMATIC READINGS IN PSI

Option 1 is used when:

a. The user is entering the reading as an elevation, and no calculation is required.

b. The weir is entered for the piezometer number, and the reading value is in cubic feet per second. For this case, the following equation is used by the program to convert weir readings entered in cubic feet per second to gallons per minute:

$$C93 = \text{READING IN GPM} = 448.3 \times [\ 2.5 \times (\text{reading}-C71)^{2.5}\ ]$$

If there is not a zero weir value in component 71, then the equation is:

$$C93 = 448.3 \times [\ 2.5 \times (\text{reading})^{2.5}\ ]$$

The constants are based on unit conversions and 90-deg V-notch weir equations from Streeter and Wylie (1975).

c. When a piezometer is dry, frozen, or reading Ø psi, the user should enter DRY PIZ, FROZEN, or Ø PSI. The program will convert the character data to a numeric value which is used for indicating these special cases on data plot. The numeric values corresponding to the various cases are:

DRY PIZ	9999.9
Ø PSI	8888.8
FROZEN	7777.7

Option 2 is used when the user is entering the reading as a depth. This option will convert depth readings to elevation readings using the top of riser elevation stored in C51 from the piezometer information level. Thus,

READING IN ELEVATION = TOP OF RISER ELEVATION - DEPTH

C93 = C51 - (reading)

Option 3 is used when the user is entering the readings for an air-actuated piezometer. For this reduction procedure, the tip elevation must be stored in component 41. The calculation is done by:

ELEVATION = PRESSURE AT PIEZOMETER TIP × 2.31 + TIP ELEVATION

C93 = (reading) × 2.31 + C49

Option 4 is used when the user is entering readings for uplift cell gauges in units of psi. The gauge elevation is stored in component 51 (top of riser elevation) for this procedure. For this option the reduction equation is:

ELEVATION = UPLIFT PRESSURE × 2.31 + TOP OF RISER ELEVATION (gauge elevation)

C93 = (reading) × 2.31 + C51

Option 5 is similar to the fourth option but for gauge pressure instruments where the readings are in pounds per square inch (e.g., a pressure gauge at the top of riser pipe).

ELEVATION = GAUGE PRESSURE 2.31 + TOP OF RISER ELEVATION

C93 = (input value) x 2.31 + C51

Option 6 is used when the user is entering water level (staff) gauge readings in feet. The elevation for the zero gauge reading must be stored in component 51 (top of riser elevation) for this reduction procedure. The output will be calculated by:

ELEVATION = WATER LEVEL GAUGE READING + TOP OF RISER ELEVATION (zero gauge elevation)

C93 = (input value) + C51

Option 7 is used when the user is entering pneumatic readings in psi. The calibration constant is stored in component 71 and the output is calculated as follows:

ELEVATION = [(PNEUMATIC READING + CALB. CONSTANT) × 2.31] + TIP ELEVATION

C93 = [((READING) + C71) × 2.31] + C49

26. The files PZPRFL and PZFL are accessed and modified during both data entry and loading procedures. If a project or piezometer name is new and misspelled, that name will appear in either PZPRFL of PZFL. The user will need to recreate these files by using the following command:

-BLDPIZ (for build piezometer files)

Table 6 shows examples of the PZPRFL and PZFL created by the above procedure. The PZPRFL includes the project name, the number of the first project piezometer, and the number of instruments associated with the project. The PZFL includes the piezometer name and type. The piezometer type and the associated data reduction option are shown below. Several abbreviations are used to indicate the piezometer type of those instruments which are not piezometers.

Table 6

Examples of PZPRFL and PZFL

PZPRFL:

Project Names	Position of Piezometers	Total Number Piezometers
MICHAEL KIRWAN	1	12
TIONESTA LAKE	13	2

PZFL:

Piezometer Names	Types of Piezometers
70-C-1	OPEN STANDPIPE
70-C-2	OPEN STANDPIPE
70-C-3	OPEN STANDPIPE
70-C-4	OPEN STANDPIPE
POOL	POOL
PRECIP.	PRECIP.
70-C-5	OPEN STANDPIPE
70-C-6	OPEN STANDPIPE
29-BC	GAUGE ON STANDPIPE
38-AC	OPEN STANDPIPE
48-AWP	GAUGE ON STANDPIPE
50-AWP	OPEN STANDPIPE
78-T-1	OPEN STANDPIPE
78-T-2	OPEN STANDPIPE

These special types are for weather (WEATH.), air temperature (A.T.), precipitation (PRECIP.), upper gauge (U/G), lower gauge (L/G), and tailwater (T.W.). The spelling of piezometer types must be exact for the program to retrieve the correct code.

Piezometer Type	Reading/Number option/code
POOL, WEATH., SUMP, A.T., PRECIP., WEIR	1
OPEN STANDPIPE, RELIEF WELL	2
STANDPIPE BUBBLER	3
U.P. CELL	4
GAUGE ON STANDPIPE	5
U/G, L/G, T.W.	6
PNEUMATIC	7

If the piezometer type listed in component 59 and PZFL file corresponds to one of the above names, the user will not have to choose the data reduction option.

27. After each data entry session, all data is appended to the end of a data file called DATPIZ. It is not recommended that the user attempts to edit this data file due to the data formatting shown in Table 3 and because the data file will not be loaded correctly if data fields are shifted.

Accessing and operation of load programs

28. At the user's convenience the data file DATPIZ may be loaded to the data base by the following command:

-UPDPIZ (for update piezometer)

This loading procedure is done interactively; therefore, the just-loaded data are available immediately for retrievals. The user should back up the data base after each interactive load using the procedure presented in Appendix A. To reduce the cost, the user may want to load the data using a batch method with a lower job priority. To use this procedure, the user must type:

BEGIN,, UPDPIZB (for update piezometer batch)

The terminal response is "submit complete" and the assigned job name. The job priority number may be assigned by the user on the JOB card in the UPDPIZB procedure file. The process time is also dependent on the number of higher priority jobs waiting to be executed. It is recommended that batch loading be done overnight so that the data base is not inaccessible to the user during the day, or the load procedure is terminated because the data base is in use. The load process requires exclusive use of the data base and will automatically back up the data base. To check the status of a batch job, the user must type in

ENQUIRE, JN = *yyy* where *yyy* = last three letters of the computer assigned batch job name

29. During the load process a file called SUMFLE (for summary file) is created. This is a summary listing of the data that are loaded to the data base. If any problems within the load program develop between the data and data base during the load process, the error message will be in this file. It will also help the user to determine what kind of error there is and where the error is located. The batch loading may be checked in the same way. In addition to the SUMFLE, a batch job also generates a file called PIZDAY, which contains all steps of execution. If a FORTRAN execution error occurred during loading and SUMFLE was not updated, the PIZDAY file should be checked. This file will contain system errors that may have damaged the data base. Table 7A shows an example of SUMFLE (called SUMPIZ henceforth) with no errors. Table 7b illustrates the file when an error has occurred and shows how to correct it. Table 8 is an example of PIZDAY. If the following error message is generated in the SUMPIZ during an interactive loading procedure, the user needs to contact the system administrator to determine where the error is:

WRAPUP CALLED FROM:
SUBROUTINE "ROUTINE NAME"
AFTER THE DB OPERATION OF "DATA BASE OPERATION"
WITH A RETURN CODE OF "RETURN CODE"
WITH A LEVEL NUMBER OF "LEVEL OF DATA BASE WHERE ERROR OCCURRED"

Table 7

Examples of SUMPIZ

A.

```
/OLD:SUMPIZ
/LIST
  PROJECT  MICHAEL KIRWAN                    INSERTED
 PIEZ      70-C-1       INSERTED
 READING   1982/09/23        969.10
 READING   1982/10/27        970.10
 PIEZ      29-BC        INSERTED
 READING   1982/09/23       1070.90
 READING   1982/10/27       1070.90
 PIEZ      PRECIP.      INSERTED
 READING   1982/09/23           .10
 PIEZ      POOL         INSERTED
 READING   1982/09/23        976.30
 PIEZ      70-C-2       INSERTED
 READING   1982/09/23        931.80
/
```

B.

```
/OLD:SUMPIZ
/LIST
 PROJECT  MICHAEL KIRWAN                    MODIFIED
 READING  1983/05/25          44.60
WRAPUP CALLED FROM:
SUBROUTINE IPIEZD
AFTER THE DB OPERATION OF INSERT
WITH A RETURN CODE OF    10
WITH A LEVEL NUMBER OF      1
/
```

Table 8

Error Message Files

PIZDAY:

```
16.36.05.JOB,CM200000,T2000,P8.
16.36.05.ABF : INPUT  ,   0.003KIODB,01.
16.36.05.USER,CEROW9,,KOE.
16.36.05.ABG : P6.
16.36.06.CHARGE,CEROEGC,CEROW9.
16.36.06.MAP,OFF.
16.36.06.GET,SUMFLE.
16.36.06.GET,S2KGET/UN=CECE2K.
16.36.07.GET,TRANFL.
16.36.07.GET,DATPIZ.
16.36.07.GET,SUMFLE.
16.36.07.GET,PIZMODU/UN=CEROW9.
16.36.08.PIZMODU.
16.36.17.FTN - FATAL ERROR   78
16.36.18.EXIT.
```

FORTRAN ERROR:

```
0  RECORD AT 066251 PIEZ115T.W.      09/23/82Y29.9
                    12345678901234567890.....'....1234567890
 * ERROR DATA INPUT * ILLEGAL DATA IN FIELD *'*
 ERROR NUMBER   78   DETECTED BY INCOM=  AT ADDRESS 000210
 CALLED FROM KRAKER= AT ADDRESS 000345
 CALLED FROM DECODE= AT ADDRESS 000041
 CALLED FROM IPIEZD  AT  LINE 38
 CALLED FROM HPIEZ   AT  LINE 156
 CALLED FROM HANRDS  AT  LINE 50
 CALLED FROM DOPIEZ  AT  LINE 18
 CALLED FROM MAIN    AT  LINE 103
FTN - FATAL ERROR   78
FTN - FATAL ERROR   78
```

A transaction file, called PZTRFL (PIEZOMETER TRANSACTION FILE) is also generated at this time. This file contains the reduced data, formatted with column headings. An example is shown in Table 9. The files, SUMPIZ and PZTRFL, are replaced with new material after every successful transfer of data to the data base. PIZDAY is only replaced when there is an error message.

30. After the data is successfully loaded to the data base and the user has verified this by accessing either the SUMFLE or the data within the data base, the data currently in DATPIZ must be cleared and readied for more data. To accomplish this, the following command is used:

-CLRPIZ (for clear piezometer)

Examples

31. Example 1. The example shown in Table 10 illustrates the data entry program operation for a new project, new piezometers, modifying type of piezometer, and readings. The long prompts are used along with the default prompt sequence for the project data and selected prompts for the piezometer information. A listing of the data file DATPIZ and both the time sharing and batch load procedures are included in the example. The cost of the data entry portion of this example executed on the CDC computer was $2.20. The batch loading costs about $1.85.

Table 9

Example of a Piezometer Transaction File (PZTRFL)

PIEZ. OR GUAGE NO.: 70-C-1 TOP OF RISER OR GUAGE ELEV.: 1015.0

TYPE OF PIEZ.: OPEN STANDPIPE TIP ELEV.: 936.0

DATE OF READING	T.O.R. DEPTH FEET	METHOD OF READING	REMARKS
1982/09/23	45.9	ELEV PROBE	RISING POOL

PIEZ. OR GUAGE NO.: 29-BC TOP OF RISER OR GUAGE ELEV.: 944.4

TYPE OF PIEZ.: GAUGE ON STANDPIPE TIP ELEV.: 838.7

DATE OF READING	GUAGE PRESS PSI	METHOD OF READING		REMARKS	
1982/09/23	3174.	-NULL-	-NULL	-NULL-	-NULL-

PIEZ. OR GUAGE NO.: PRECIP. TOP OF RISER OR GUAGE ELEV.: 0.0

TYPE OF PIEZ.: PRECIP. TIP ELEV.: 0.0

DATE OF READING	WATER ELEV FEET	METHOD OF READING		REMARKS
1982/09/23	.1	-NULL-	-NULL	RAIN GAUGE

/

Table 10

Data Entry Procedures for New Project and New Piezometers (Example 1)

```
-INPPIZ
 DO YOU WANT SHORTENED PROMPTS?(Y OR N)
? N


          PIEZOMETER DATA ENTRY SYSTEM


 PROJECT NAME(INPUT END TO QUIT)?
? MICHAEL KIRWAN
 IS THIS A NEW PROJECT?(Y OR N)
? Y
 PLEASE SELECT ONE OF THE FOLLOWING OPTIONS:
     1,........ USE THE DEFAULT PROMPT SEQUENCE
     2,........ CREATE MY PROMPT SEQUENCE
     3,........ USE THE TAILORED PROMPT SEQUENCE
     4,........ KEEP THE CURRENT PROMPT SEQUENCE

 INPUT THE DESIRED OPTION

? 1
 PROJECT RIVER?
? W.B.MAHONING R
 PROJECT STATE?
? OHIO
 PROJECT TOWN?
? WAYLAND
 DISTRICT?
? PGH
 TYPE OF STRUCTURE?
? ZONED EARTH EMB
 CREST ELEVATION?
? 1011.0
 SPILLWAY ELEVATION?
? 993.0
```

Default option will ask the user for all prompts listed in the driver file, Table 4 for either the project or piezometer level.

(Continued)

(Sheet 1 of 16)

Table 10 (Continued)

```
 MAXIMUM POOL ELEVATION?
? 1500.0
  1500.000 IS NOT WITHIN THE LIMITS: [   980.00   ,   1020.00   ]
 MAXIMUM POOL ELEVATION?
? 1005.0
 MINIMUM POOL ELEVATION?
? 951.0
 NORMAL POOL ELEVATION?
? 985.0
 MAXIMUM TAILWATER ELEVATION?
? 950.0
 MINIMUM TAILWATER ELEVATION?
? 935.0
 NORMAL TAILWATER  ELEVATION?
? 932.0
 POOL OF RECORD?
? 989.2
 DATE OF POOL RECORD?(MM/DD/YY)
? 02/01/72
 ALERT POOL ?
? 989.2
 DATE CONSTRUCTION BEGAN?(MM/DD/YY)
? 05/01/63
 DATE CONSTRUCTION COMPLETED?(MM/DD/YY)
? 11/01/66
OREVIEW OF INPUT
 LINE #     DB NAME          DATA VALUE
    1 .... PROJ-NAME    .. MICHAEL KIRWAN
    2 .... PROJ-RIVER   .. W.B.MAHONING R
    3 .... PROJ-STATE   .. OHIO
    4 .... PROJ-TOWN    .. WAYLAND
    5 .... DIST         .. PGH
    6 .... TYP-STRT     .. ZONED EARTH EMB
    7 .... CRT          .. 1011.0
    8 .... SPY          .. 993.0
    9 ....   MXPL       .. 1005.0
   10 .... MNPL         .. 951.0
   11 .... NRPL         .. 985.0
   12 .... MXTW         .. 950.0
   13 .... MNTW         .. 935.0
   14 .... NRTW         .. 932.0
```

Preset value as listed in Table 5.

(Continued)

(Sheet 2 of 16)

Table 10 (Continued)

```
   15 .... RECPL        .. 989.2
   16 .... DRPL         .. 02/01/72
   17 .... ALTPL        .. 989.2
   18 .... CONT-BEG     .. 05/01/63
   19 .... CONT-COM     .. 11/01/66
OTO CHANGE AN ITEM, TYPE ITS LINE #
 OTHERWISE HIT RETURN
? 13        Line number.
  13...MINIMUM TAILWATER ELEVATION?
 ? 930.5                          Correct elevation.
 OTO CHANGE AN ITEM, TYPE ITS LINE #
  OTHERWISE HIT RETURN
 ?
 O DO YOU WISH TO REVIEW VALUES AGAIN?(Y OR N)?
 ? Y
 OREVIEW OF INPUT
  LINE #     DB NAME          DATA VALUE
      1 .... PROJ-NAME    .. MICHAEL KIRWAN
      2 .... PROJ-RIVER   .. W.B.MAHONING R
      3 .... PROJ-STATE   .. OHIO
      4 .... PROJ-TOWN    .. WAYLAND
      5 .... DIST         .. PGH
      6 .... TYP-STRT     .. ZONED EARTH EMB
      7 .... CRT          .. 1011.0
      8 .... SPY          .. 993.0
      9 ....   MXPL       .. 1005.0
     10 .... MNPL         .. 951.0
     11 .... NRPL         .. 985.0
     12 .... MXTW         .. 950.0
     13 .... MNTW         .. 930.5
     14 .... NRTW         .. 932.0
     15 .... RECPL        .. 989.2
     16 .... DRPL         .. 02/01/72
     17 .... ALTPL        .. 989.2
     18 .... CONT-BEG     .. 05/01/63
     19 .... CONT-COM     .. 11/01/66
 OTO CHANGE AN ITEM, TYPE ITS LINE #
  OTHERWISE HIT RETURN
 ?
   OPTIONS
    1... INPUT NEW INSTRUMENT
    2... MODIFY EXISTING INSTRUMENT/DATA VALUES
```

(Continued)

(Sheet 3 of 16)

Table 10 (Continued)

```
   3... INPUT READING VALUES
   4... BE PROMPTED FOR SETS OF READINGS
   5... NO MORE INSTRUMENTS TO ENTER
  INPUT THE DESIRED OPTION


? 1
 PIEZOMETER OR GAUGE NUMBER?
? 70-C-1
 PLEASE SELECT ONE OF THE FOLLOWING OPTIONS:
      1 ........ USE THE DEFAULT PROMPT SEQUENCE
      2 ........ CREATE MY PROMPT SEQUENCE
      3 ........ USE THE TAILORED PROMPT SEQUENCE
      4 ........ KEEP THE CURRENT PROMPT SEQUENCE

 INPUT THE DESIRED OPTION!


? 2              Will create prompt sequence.
 DO YOU NEED THE PROMPT LIST?(Y OR N)
? Y
  NO.            PROMPTS
   21 ........ FEATURE DESCRIPTION?(10 CHAR. MAX)
   22 ........ STATION?(8 CHAR. MAX)
   23 ........ OFFSET OR STATION?(8 CHAR. MAX)
   24 ........ PIEZOMETER TIP ELEVATION?
   25 ........ TOP OF RISER OR GAUGE ELEVATION?
   26 ........ GROUND SURFACE ELEVATION?
   27 ........ RISER PIPE DIAMETER?
   28 ........ SOIL TYPE AT TIP?(7 CHAR. MAX)
   29 ........ TYPE OF PIEZOMETER?(20 CHAR. MAX)
   30 ........ STATUS OF PIEZOMETER?(10 CHAR. MAX)
   31 ........ DATE OF INSTALLATION?(MM/DD/YY)
   32 ........ LOCATION OF INSTALLATION REPORT?(10 CHAR. MAX)
   33 ........ METHOD OF INSTALLATION?(25 CHAR. MAX)
   34 ........ INSTALLED BY?(15 CHAR. MAX)
   35 ........ METHOD OF TESTING?(15 CHAR. MAX)
   36 ........ REFERENCE DRAWING? (20 CHAR. MAX.)
   37 ........ CALIBRATION CONSTANT?
   38 ........ FILTER MATERIAL?(15 CHAR. MAX)
   39 ........ TOP ELEVATION OF FILTER?
   40 ........ BOTTOM ELEVATION OF FILTER?
```

(Continued)

(Sheet 4 of 16)

Table 10 (Continued)

```
    41 ........ SEAL MATERIAL?(15 CHAR. MAX)
    42 ........ TOP ELEVATION OF SEAL?
    43 ........ BOTTOM ELEVATION OF SEAL?
    44 ........ DATE OF LAST READING?(MM/DD/YY)
    45 ........ DATE OF NEXT READING?(MM/DD/YY)
    46 ........ INTERVAL BETWEEN READING?(10 CHAR. MAX)
    47 ........ 1ST THRESHOLD VALUE?
    48 ........ 2ND THRESHOLD VALUE?
    49 ........ 3RD THRESHOLD VALUE?
    50 ........ 4TH THRESHOLD VALUE?
 INPUT THE PROMPT NUMBER (HIT RETURN TO STOP)
  #?
? 21
  #?
? 22
  #?
? 23
  #?
? 29
  #?
? 30
  #?
? 24
  #?
? 25
  #?
? 50
  #?
?
 DO YOU WANT TO SAVE THIS PROMPT SEQUENCE?(Y OR N)
 THIS WILL REPLACE THE CURRENT TAILORED SEQUENCE
 FOR PIEZ. LEVEL INFORMATION IF SAVED
? Y
 FEATURE DESCRIPTION?(10 CHAR. MAX)
? EMB.
 STATION?(8 CHAR. MAX)
? 44+00
 OFFSET OR STATION?(8 CHAR. MAX)
? 150/S
 TYPE OF PIEZOMETER?(20 CHAR. MAX)
? OPEN STANDPIPE
 STATUS OF PIEZOMETER?(10 CHAR. MAX)
? OPER.
```

Prompts number may be selected out of sequence.

(Continued)

(Sheet 5 of 16)

Table 10 (Continued)

```
 PIEZOMETER TIP ELEVATION?
? 936.0
 TOP OF RISER OR GAUGE ELEVATION?
? 1015.0
 4TH THRESHOLD VALUE?
? 0.0
     0.000 IS NOT WITHIN THE LIMITS: [   850.00   ,   1100.00   ]
 4TH THRESHOLD VALUE?
? 1100.00
0REVIEW OF INPUT
 LINE #     DB NAME          DATA VALUE
    1 .... PFD          .. EMB.
    2 .... PSTA         .. 46+00
    3 .... POFF         .. 15U/S
    4 .... TYPIEZ       .. OPEN STANDPIPE
    5 .... PSAT         .. OPEN.
    6 .... TIPEL        .. 936.0
    7 .... TREL         .. 1015.0
    8 .... PTH4         .. 1100.0
0TO CHANGE AN ITEM: TYPE ITS LINE #
 OTHERWISE HIT RETURN
?
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 09/23/82


READING?
? 45.9
 METHOD OF READING?(15 CHAR. MAX)
? TAPE
 REMARKS?(20 CHAR. MAX)
? NONE
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 10/27/82


READING?
? 44.9
 METHOD OF READING?(15 CHAR. MAX)
? TAPE
 REMARKS?(20 CHAR. MAX)
? NONE
```

(Continued)

(Sheet 6 of 16)

Table 10 (Continued)

```
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 11/11/99
                        COLUMNS
          1            2              3                      4
 LINE #
    1      09/23/82    45.9           TAPE                   NONE
    2      10/27/82    44.9           TAPE                   NONE
 TO CHANGE AN ITEM TYPE ITS LINE NUMBER, A COMMA
 AND ITS COLUMN NUMBER (E.G. 3,2 - LINE 3 COLUMN 2)
 OTHERWISE HIT RETURN
?
  OPTIONS
   1... INPUT NEW INSTRUMENT
   2... MODIFY EXISTING INSTRUMENT/DATA VALUES
   3... INPUT READING VALUES
   4... BE PROMPTED FOR SETS OF READINGS
   5... NO MORE INSTRUMENTS TO ENTER
  INPUT THE DESIRED OPTION


? 1
 PIEZOMETER OR GAUGE NUMBER?
? 29-BC
 PLEASE SELECT ONE OF THE FOLLOWING OPTIONS:
     1 ........ USE THE DEFAULT PROMPT SEQUENCE
     2 ........ CREATE MY PROMPT SEQUENCE
     3 ........ USE THE TAILORED PROMPT SEQUENCE
     4 ........ KEEP THE CURRENT PROMPT SEQUENCE

 INPUT THE DESIRED OPTION!


? 4
 FEATURE DESCRIPTION?(10 CHAR. MAX)
?                                          Carriage return if no data
 STATION?(8 CHAR. MAX)                     is to be entered.
? 44+14
 OFFSET OR STATION?(8 CHAR. MAX)
? 600D/S
 TYPE OF PIEZOMETER?(20 CHAR. MAX)
? GAUGE ON STANDPIPE
 STATUS OF PIEZOMETER?(10 CHAR. MAX)
? OPER.
```

(Continued)

(Sheet 7 of 16)

Table 10 (Continued)

```
 PIEZOMETER TIP ELEVATION?
? 838.7
 TOP OF RISER OR GAUGE ELEVATION?
? 944.4
 4TH THRESHOLD VALUE?
?
OREVIEW OF INPUT
 LINE #     DB NAME          DATA VALUE
    1 .... PFD          ..
    2 .... PSTA         .. 46414
    3 .... POFF         .. 600D/S
    4 .... TYPIEZ       .. GAUGE ON STANDPIPE
    5 .... PSAT         .. OPER.
    6 .... TIPEL        .. 838.7
    7 .... TREL         .. 944.4
    8 .... PTH4         ..
OTO CHANGE AN ITEM, TYPE ITS LINE #
 OTHERWISE HIT RETURN
?
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 09/23/82


READING?
? 54.76
 METHOD OF READING?(15 CHAR. MAX)
?
 REMARKS?(20 CHAR. MAX)
?
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 10/27/82


READING?
? 54.76
 METHOD OF READING?(15 CHAR. MAX)
?
 REMARKS?(20 CHAR. MAX)
?
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 11/11/99
```

(Continued)

(Sheet 8 of 16)

Table 10 (Continued)

```
                    COLUMNS
          1          2              3                    4
 LINE #
    1      09/23/82    54.76
    2      10/27/82    54.76
 TO CHANGE AN ITEM TYPE ITS LINE NUMBER, A COMMA
 AND ITS COLUMN NUMBER (E.G. 3,2 - LINE 3 COLUMN 2)
 OTHERWISE HIT RETURN
?
  OPTIONS
   1... INPUT NEW INSTRUMENT
   2... MODIFY EXISTING INSTRUMENT/DATA VALUES
   3... INPUT READING VALUES
   4... BE PROMPTED FOR SETS OF READINGS
   5... NO MORE INSTRUMENTS TO ENTER
  INPUT THE DESIRED OPTION


? 1
 PIEZOMETER OR GAUGE NUMBER?
? PRECIP.
 PLEASE SELECT ONE OF THE FOLLOWING OPTIONS:
      1 ........ USE THE DEFAULT PROMPT SEQUENCE
      2 ........ CREATE MY PROMPT SEQUENCE
      3 ........ USE THE TAILORED PROMPT SEQUENCE
      4 ........ KEEP THE CURRENT PROMPT SEQUENCE

 INPUT THE DESIRED OPTION!


? 2
 DO YOU NEED THE PROMPT LIST?(Y OR N)
? N
 INPUT THE PROMPT NUMBER (HIT RETURN TO STOP)
  #?
? 29
  #?
?
 DO YOU WANT TO SAVE THIS PROMPT SEQUENCE?(Y OR N)
 THIS WILL REPLACE THE CURRENT TAILORED SEQUENCE
 FOR PIEZ. LEVEL INFORMATION IF SAVED
? N
 TYPE OF PIEZOMETER?(20 CHAR. MAX)
? PRECIP.
```

(Continued)

(Sheet 9 of 16)

Table 10 (Continued)

```
OREVIEW OF INPUT
 LINE #     DB NAME         DATA VALUE
    1 .... TYPIEZ       .. PRECIP,
OTO CHANGE AN ITEM, TYPE ITS LINE #
 OTHERWISE HIT RETURN
?
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 09/23/82


READING?
? 0.1
 METHOD OF READING?(15 CHAR. MAX)
?
 REMARKS?(20 CHAR. MAX)
?
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 11/11/99
                        COLUMNS
          1           2             3                    4
 LINE #
    1     09/23/82    0.1
 TO CHANGE AN ITEM TYPE ITS LINE NUMBER, A COMMA
 AND ITS COLUMN NUMBER (E.G. 3,2 - LINE 3 COLUMN 2)
 OTHERWISE HIT RETURN
?
  OPTIONS
   1... INPUT NEW INSTRUMENT
   2... MODIFY EXISTING INSTRUMENT/DATA VALUES
   3... INPUT READING VALUES
   4... BE PROMPTED FOR SETS OF READINGS
   5... NO MORE INSTRUMENTS TO ENTER
  INPUT THE DESIRED OPTION


? 1
 PIEZOMETER OR GAUGE NUMBER?
? POOL
 PLEASE SELECT ONE OF THE FOLLOWING OPTIONS:
     1 ........ USE THE DEFAULT PROMPT SEQUENCE
     2 ........ CREATE MY PROMPT SEQUENCE
     3 ........ USE THE TAILORED PROMPT SEQUENCE
     4 ........ KEEP THE CURRENT PROMPT SEQUENCE

 INPUT THE DESIRED OPTION!
```

(Continued)

(Sheet 10 of 16)

Table 10 (Continued)

Current prompt sequence is the last sequence used.

```
? 4
 TYPE OF PIEZOMETER?(20 CHAR. MAX)
? POOL
OREVIEW OF INPUT
 LINE #     DB NAME          DATA VALUE
    1 ,... TYPIEZ       ,. POOL
OTO CHANGE AN ITEM, TYPE ITS LINE #
 OTHERWISE HIT RETURN
?
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 09/23/82


READING?
? 976.3
 METHOD OF READING?(15 CHAR. MAX)
?
 REMARKS?(20 CHAR. MAX)
?
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 11/11/99
                      COLUMNS
          1           2            3                    4
 LINE #
    1     09/23/82   976.3
 TO CHANGE AN ITEM TYPE ITS LINE NUMBER, A COMMA
 AND ITS COLUMN NUMBER (E.G. 3,2 - LINE 3 COLUMN 2)
 OTHERWISE HIT RETURN
?
  OPTIONS
   1... INPUT NEW INSTRUMENT
   2... MODIFY EXISTING INSTRUMENT/DATA VALUES
   3... INPUT READING VALUES
   4... BE PROMPTED FOR SETS OF READINGS
   5... NO MORE INSTRUMENTS TO ENTER
  INPUT THE DESIRED OPTION


? 1
 PIEZOMETER OR GAUGE NUMBER?
? 70-C-2

 PLEASE SELECT ONE OF THE FOLLOWING OPTIONS:
     1 ........ USE THE DEFAULT PROMPT SEQUENCE
```

(Continued)

(Sheet 11 of 16)

Table 10 (Continued)

```
      2 ........ CREATE MY PROMPT SEQUENCE
      3 ........ USE THE TAILORED PROMPT SEQUENCE
      4 ........ KEEP THE CURRENT PROMPT SEQUENCE

 INPUT THE DESIRED OPTION!


?  PLEASE SELECT ONE OF THE FOLLOWING OPTIONS:
      1 ........ USE THE DEFAULT PROMPT SEQUENCE
      2 ........ CREATE MY PROMPT SEQUENCE
      3 ........ USE THE TAILORED PROMPT SEQUENCE
      4 ........ KEEP THE CURRENT PROMPT SEQUENCE

 INPUT THE DESIRED OPTION!


? 3                          Use prompt sequence created earlier.
 FEATURE DESCRIPTION?(10 CHAR. MAX)
? FDN.OB.
 STATION?(8 CHAR. MAX)
? 46+00
 OFFSET OR STATION?(8 CHAR. MAX)
? 120D/S
 TYPE OF PIEZOMETER?(20 CHAR. MAX)
?                                          Type of piezometer omitted.
 STATUS OF PIEZOMETER?(10 CHAR. MAX)
? OPER.
 PIEZOMETER TIP ELEVATION?
? 982.0
 TOP OF RISER OR GAUGE ELEVATION?
? 975.0
 4TH THRESHOLD VALUE?
?
OREVIEW OF INPUT
 LINE #     DB NAME          DATA VALUE
     1 .... PFD          .. FDN.OB.
     2 .... PSTA         .. 46+00
     3 .... POFF         .. 120D/S
     4 .... TYPIEZ       ..
     5 .... PSAT         .. OPER.
     6 .... TIPEL        .. 982.0
     7 .... TREL         .. 975.0
     8 .... PTH4         ..
OTO CHANGE AN ITEM, TYPE ITS LINE #
```

(Continued)

(Sheet 12 of 16)

Table 10 (Continued)

If the user select the wrong line number, the value must be reentered.

```
 OTHERWISE HIT RETURN
? 5
  5...STATUS OF PIEZOMETER?(10 CHAR. MAX)
? OPER.
OTO CHANGE AN ITEM, TYPE ITS LINE #
 OTHERWISE HIT RETURN
? 6
  6...PIEZOMETER TIP ELEVATION?
? 928.0
OTO CHANGE AN ITEM. TYPE ITS LINE #
 OTHERWISE HIT RETURN
?
O DO YOU WISH TO REVIEW VALUES AGAIN?(Y OR N)?
? 09/23/82
OREVIEW OF INPUT
 LINE #     DB NAME          DATA VALUE
    1 .... PFD          .. FDN.OB.
    2 .... PSTA         .. 46+00
    3 .... POFF         .. 120D/S
    4 .... TYPIEZ       ..
    5 .... PSAT         .. OPER.
    6 .... TIPEL        .. 928.0
    7 .... TREL         .. 975.8
    8 .... PTH4         ..
OTO CHANGE AN ITEM, TYPE ITS LINE #
 OTHERWISE HIT RETURN
?


 THE CURRENT INSTRUMENT IS 70-C-2
 FOR THIS PIEZOMETER READING ARE YOU ENTERING
   1...ELEVATION VALUES
   2...DEPTH VALUES FROM TOP OF RISER IN FT.
   3...PIEZ.TIP GAUGE PRESSURE PSI VALUES
   4...U.P.GAUGE PRESSURE PSI VALUES
   5...OTHER TYPE GAUGE PRESSURE PSI VALUES
   6...WATER LEVEL GAUGE READING IN FEET
   7...PNEUMATIC READINGS IN PSI

  INPUT THE DESIRED OPTION
```

(Continued)

Table 10 (Continued)

```
? 2
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 09/23/82


READING?
? 44.0
 METHOD OF READING?(15 CHAR. MAX)
? TAPE
 REMARKS?(20 CHAR. MAX)
? NONE
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 11/11/99
                      COLUMNS
          1           2             3                       4
 LINE #
    1     09/23/82    44.0          TAPE                    NONE
 TO CHANGE AN ITEM TYPE ITS LINE NUMBER, A COMMA
 AND ITS COLUMN NUMBER (E.G. 3,2 - LINE 3 COLUMN 2)
 OTHERWISE HIT RETURN
?
  OPTIONS
   1... INPUT NEW INSTRUMENT
   2... MODIFY EXISTING INSTRUMENT/DATA VALUES
   3... INPUT READING VALUES
   4... BE PROMPTED FOR SETS OF READINGS
   5... NO MORE INSTRUMENTS TO ENTER
  INPUT THE DESIRED OPTION

                                    To add the "TYPE OF PIEZOMETER"
? 2                                 use the option "MODIFY EXISTING
 PIEZOMETER OR GAUGE NUMBER?        INSTRUMENT" prompt number 29.
? 70-C-2
 PLEASE SELECT ONE OF THE FOLLOWING OPTIONS:
     1 ........ USE THE DEFAULT PROMPT SEQUENCE
     2 ........ CREATE MY PROMPT SEQUENCE
     3 ........ USE THE TAILORED PROMPT SEQUENCE
     4 ........ KEEP THE CURRENT PROMPT SEQUENCE

 INPUT THE DESIRED OPTION!


? 2
```

(Continued)

(Sheet 14 of 16)

Table 10 (Continued)

```
 DO YOU NEED THE PROMPT LIST?(Y OR N)
? N
 INPUT THE PROMPT NUMBER (HIT RETURN TO STOP)
  #?
? 29
  #?
?
 DO YOU WANT TO SAVE THIS PROMPT SEQUENCE?(Y OR N)
 THIS WILL REPLACE THE CURRENT TAILORED SEQUENCE
 FOR PIEZ. LEVEL INFORMATION IF SAVED
? N
 TYPE OF PIEZOMETER?(20 CHAR. MAX)
? OPEN STANDPIPE
OREVIEW OF INPUT
 LINE #     DB NAME         DATA VALUE
    1 .... TYPIEZ       .. OPEN STANDPIPE
OTO CHANGE AN ITEM, TYPE ITS LINE #
 OTHERWISE HIT RETURN
?
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 10/25/82
```

Since PZFL now contain TYPE OF PIEZOMETER for 70-C-2, the collect program will immediately proceed to the date of reading.

```
READING?
? 46.0
 METHOD OF READING?(15 CHAR. MAX)
? TAPE
 REMARKS?(20 CHAR. MAX)
? NONE
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 11/11/99
                      COLUMNS
          1           2            3                    4
 LINE #
    1     10/25/82    46.0         TAPE                 NONE
 TO CHANGE AN ITEM TYPE ITS LINE NUMBER, A COMMA
 AND ITS COLUMN NUMBER (E.G. 3,2 - LINE 3 COLUMN 2)
 OTHERWISE HIT RETURN
?
  OPTIONS
   1... INPUT NEW INSTRUMENT
   2... MODIFY EXISTING INSTRUMENT/DATA VALUES
   3... INPUT READING VALUES
```

(Continued)

(Sheet 15 of 16)

Table 10 (Concluded)

```
   4... BE PROMPTED FOR SETS OF READINGS
   5... NO MORE INSTRUMENTS TO ENTER
  INPUT THE DESIRED OPTION


? 5
 PROJECT NAME(INPUT END TO QUIT)?
? END
 DATA ENTRY TERMINATED
```

Listing of data file DATPIZ.

```
PIEZ LOAD DATA FILE
PROJ101YMICHAEL KIRWAN                    W.B.MAHONING R
PROJ102 OHIO WAYLAND              PGW  ZONED EARTH EMB     05/01/63  11/01/66
PROJ1031011.0993.0 1005.0951.0 985.0 950.0 930.5 932.0 989.2 04/01/72  989.2
PIEZ11170-C-1     EMB.      46+00    15U/S
PIEZ11270-C-1     OPEN STANDPIPE           1015.0936.0                 OPER.
PIEZ11370-C-1                                                                1100.0
PIEZ11470-C-1
PIEZ11070-C-1
PIEZ11570-C-1     09/23/8245.9  TAPE           NONE                     2
PIEZ11570-C-1     10/27/8244.9  TAPE           NONE                     2
PIEZ11129-BC              46+14    600D/S
PIEZ11229-BC      GAUGE ON STANDPIPE       944.4 838.7                 OPER.
PIEZ11329-BC
PIEZ11429-BC
PIEZ11029-BC
PIEZ11529-BC      09/23/8254.76                                        5
PIEZ11529-BC      10/27/8254.76                                        5
PIEZ111PRECIP.
PIEZ112PRECIP.    PRECIP.
PIEZ113PRECIP.
PIEZ114PRECIP.
PIEZ110PRECIP.
PIEZ115PRECIP.    09/23/820.1                                          1
PIEZ111POOL
PIEZ112POOL       POOL
PIEZ113POOL
PIEZ114POOL
PIEZ110POOL
PIEZ115POOL       09/23/82976.3                                        1
PIEZ11170-C-2     FDN.OB.   46+00    120D/S
PIEZ11270-C-2                              975.8 978.0                 OPER.
PIEZ11370-C-2
PIEZ11470-C-2
PIEZ11070-C-2
PIEZ11570-C-2     09/23/8244.0  TAPE           NONE                     2
PIEZ11170-C-2
PIEZ11270-C-2     OPEN STANDPIPE
PIEZ11370-C-2
PIEZ11470-C-2
PIEZ11070-C-2
PIEZ11570-C-2     10/25/8246.00 TAPE           NONE                     2
```

(Sheet 16 of 16)

32. Example 2. This example, shown in Table 11, illustrates the data entry program operation for existing projects and piezometers. The long prompts are used for clarity. The usage of both the project and piezometer modification options and the reading value options are shown. The second project illustrates the prompting by instrument name option. The listing of DATPIZ is included. The cost for this data entry session on the CDC computer was $2.02.

Table 11

Data Entry Procedure for Existing Project and Piezometers (Example 2)

```
 -INPPIZ
 DO YOU WANT SHORTENED PROMPTS?(Y OR N)
? N


          PIEZOMETER DATA ENTRY SYSTEM


 PROJECT NAME(INPUT END TO QUIT)?
? KICHAEL KIRWAN
 IS THIS A NEW PROJECT?(Y OR N)
? N
 PROJECT KICHAEL KIRWAN
 DOES NOT EXIST!   TRY AGAIN
 PROJECT NAME(INPUT END TO QUIT)?
? MICHAEL KIRWAN
 IS THIS A NEW PROJECT?(Y OR N)
? N
 DO YOU NEED TO MODIFY PROJECT DATA?(Y OR N)
? Y
 PLEASE SELECT ONE OF THE FOLLOWING OPTIONS:
     1......... USE THE DEFAULT PROMPT SEQUENCE
     2......... CREATE MY PROMPT SEQUENCE
     3......... USE THE TAILORED PROMPT SEQUENCE
     4......... KEEP THE CURRENT PROMPT SEQUENCE

 INPUT THE DESIRED OPTION


? 2
 DO YOU NEED THE PROMPT LIST?(Y OR N)
? Y
  NO.            PROMPTS
    2 ......... PROJECT RIVER?
    3 ......... PROJECT STATE?
    4 ......... PROJECT TOWN?
    5 ......... DISTRICT?
    6 ......... TYPE OF STRUCTURE?
    7 ......... CREST ELEVATION?
    8 ......... SPILLWAY ELEVATION?
```

The collection program will verify the correct project or piezometer names.

Create prompt to modify the project data.

(Continued)

(Sheet 1 of 8)

Table 11 (Continued)

```
    9 ........ MAXIMUM POOL ELEVATION?
   10 ........ MINIMUM POOL ELEVATION?
   11 ........ NORMAL POOL ELEVATION?
   12 ........ MAXIMUM TAILWATER ELEVATION?
   13 ........ MINIMUM TAILWATER ELEVATION?
   14 ........ NORMAL TAILWATER  ELEVATION?
   15 ........ POOL OF RECORD?
   16 ........ DATE OF POOL RECORD?(MM/DD/YY)
   17 ........ ALERT POOL?
   18 ........ DATE CONSTRUCTION BEGAN?(MM/DD/YY)
   19 ........ DATE CONSTRUCTION COMPLETED?(MM/DD/YY)
 INPUT THE PROMPT NUMBER (HIT RETURN TO STOP)
  #?
? 14          The data base value to be changed
  #?          is normal tailwater elevation.
?
 DO YOU WANT TO SAVE THIS PROMPT SEQUENCE(Y OR N)
 THIS WILL REPLACE THE CURRENT TAILORED PROMPT SEQUENCE
 FOR PROJECT LEVEL INFORMATION IF SAVED
? N
 NORMAL TAILWATER  ELEVATION?    The correct elevation that will
? 935.0                          replace the one in the data base.
OREVIEW OF INPUT
 LINE #    DB NAME        DATA VALUE
    1 .... PROJ-NAME   .. MICHAEL KIRWAN
    2 .... NRTW        .. 935.0
OTO CHANGE AN ITEM, TYPE ITS LINE #
 OTHERWISE HIT RETURN
?
  OPTIONS
   1... INPUT NEW INSTRUMENT
   2... MODIFY EXISTING INSTRUMENT/DATA VALUES
   3... INPUT READING VALUES
   4... BE PROMPTED FOR SETS OF READINGS
   5... NO MORE INSTRUMENTS TO ENTER
  INPUT THE DESIRED OPTION


? 2
 PIEZOMETER OR GAUGE NUMBER?     To modify data value in
? 70-C-1                         piezometer 70-C-1.
 PLEASE SELECT ONE OF THE FOLLOWING OPTIONS:
     1 ........ USE THE DEFAULT PROMPT SEQUENCE
     2 ........ CREATE MY PROMPT SEQUENCE
     3 ........ USE THE TAILORED PROMPT SEQUENCE
     4 ........ KEEP THE CURRENT PROMPT SEQUENCE

 INPUT THE DESIRED OPTION!
```

(Continued)

(Sheet 2 of 8)

Table 11 (Continued)

```
? 2
 DO YOU NEED THE PROMPT LIST?(Y OR N)
? Y
  NO.           PROMPTS
   21 ........ FEATURE DESCRIPTION?(10 CHAR. MAX)
   22 ........ STATION?(8 CHAR. MAX)
   23 ........ OFFSET OR STATION?(8 CHAR. MAX)
   24 ........ PIEZOMETER TIP ELEVATION?
   25 ........ TOP OF RISER OR GAUGE ELEVATION?
   26 ........ GROUND SURFACE ELEVATION?
   27 ........ RISER PIPE DIAMETER?
   28 ........ SOIL TYPE AT TIP?(7 CHAR. MAX)
   29 ........ TYPE OF PIEZOMETER?(20 CHAR. MAX)
   30 ........ STATUS OF PIEZOMETER?(10 CHAR. MAX)
   31 ........ DATE OF INSTALLATION?(MM/DD/YY)
   32 ........ LOCATION OF INSTALLATION REPORT?(10 CHAR. MAX)
   33 ........ METHOD OF INSTALLATION?(25 CHAR. MAX)
   34 ........ INSTALLED BY?(15 CHAR. MAX)
   35 ........ METHOD OF TESTING?(15 CHAR. MAX)
   36 ........ REFERENCE DRAWING? (20 CHAR. MAX.)
   37 ........ CALIBRATION CONSTANT?
   38 ........ FILTER MATERIAL?(15 CHAR. MAX)
   39 ........ TOP ELEVATION OF FILTER?
   40 ........ BOTTOM ELEVATION OF FILTER?
   41 ........ SEAL MATERIAL?(15 CHAR. MAX)
   42 ........ TOP ELEVATION OF SEAL?
   43 ........ BOTTOM ELEVATION OF SEAL?
   44 ........ DATE OF LAST READING?(MM/DD/YY)
   45 ........ DATE OF NEXT READING?(MM/DD/YY)
   46 ........ INTERVAL BETWEEN READING?(10 CHAR. MAX)
   47 ........ 1ST THRESHOLD VALUE?
   48 ........ 2ND THRESHOLD VALUE?
   49 ........ 3RD THRESHOLD VALUE?
   50 ........ 4TH THRESHOLD VALUE?
 INPUT THE PROMPT NUMBER (HIT RETURN TO STOP)
  #?
? 30            To update the status of the
  #?            piezometer.
?
 DO YOU WANT TO SAVE THIS PROMPT SEQUENCE?(Y OR N)
 THIS WILL REPLACE THE CURRENT TAILORED SEQUENCE
 FOR PIEZ. LEVEL INFORMATION IF SAVED
? N
 STATUS OF PIEZOMETER?(10 CHAR. MAX)
? INOPER.
OREVIEW OF INPUT
 LINE #     DB NAME        DATA VALUE
    1 .... PSAT        .. INOPER.
```

(Continued)

(Sheet 3 of 8)

Table 11 (Continued)

```
OTO CHANGE AN ITEM, TYPE ITS LINE #
 OTHERWISE HIT RETURN
?
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 11/11/99          New readings could be entered.
  OPTIONS
   1... INPUT NEW INSTRUMENT
   2... MODIFY EXISTING INSTRUMENT/DATA VALUES
   3... INPUT READING VALUES
   4... BE PROMPTED FOR SETS OF READINGS
   5... NO MORE INSTRUMENTS TO ENTER
  INPUT THE DESIRED OPTION

              Continue to enter readings for other
? 3           piezometers.
 PIEZOMETER OR GAUGE NUMBER?
? 70-C-2
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 12/23/82


READING?
? 43.80
 METHOD OF READING?(15 CHAR. MAX)
? TAPE
 REMARKS?(20 CHAR. MAX)
? NONE
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 11/11/99
                        COLUMNS
          1           2             3                      4
 LINE #
    1     12/23/82    43.80         TAPE                   NONE
 TO CHANGE AN ITEM TYPE ITS LINE NUMBER, A COMMA
 AND ITS COLUMN NUMBER (E.G. 3,2 - LINE 3 COLUMN 2)
 OTHERWISE HIT RETURN
?
  OPTIONS
   1... INPUT NEW INSTRUMENT
   2... MODIFY EXISTING INSTRUMENT/DATA VALUES
   3... INPUT READING VALUES
   4... BE PROMPTED FOR SETS OF READINGS
   5... NO MORE INSTRUMENTS TO ENTER
  INPUT THE DESIRED OPTION

              This option is most useful when all the instrument information
? 4           has been entered and the user needs to enter only the reading
              values for all piezometers taken on the same date.
```

(Continued)

(Sheet 4 of 8)

Table 11 (Continued)

```
 WILL PROMPT BY PIEZOMETER NOW
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 01/23/83

 READING FOR 70-C-1      (RETURN IF NONE / END TO QUIT)?
?
                         No reading ,instrument inoperative.

 READING FOR 70-C-2      (RETURN IF NONE / END TO QUIT)?
? 45,2
 METHOD OF READING?(15 CHAR. MAX)
?
 REMARKS?(20 CHAR. MAX)
?

 READING FOR 70-C-3      (RETURN IF NONE / END TO QUIT)?
? 52,1
 METHOD OF READING?(15 CHAR. MAX)
?
 REMARKS?(20 CHAR. MAX)
?

 READING FOR 70-C-4      (RETURN IF NONE / END TO QUIT)?
? 43,5
 METHOD OF READING?(15 CHAR. MAX)
?
 REMARKS?(20 CHAR. MAX)
?

 READING FOR POOL        (RETURN IF NONE / END TO QUIT)?
?
                         No reading to enter,not taken
                         on 01/23/83.

 READING FOR PRECIP.     (RETURN IF NONE / END TO QUIT)?
? ,2
 METHOD OF READING?(15 CHAR. MAX)
?
 REMARKS?(20 CHAR. MAX)
?
```

(Continued)

(Sheet 5 of 8)

Table 11 (Continued)

```
 READING FOR 70-C-5      (RETURN IF NONE / END TO QUIT)?
? END
```

User may continue to enter reading values for all existing piezometers.

```
                        COLUMNS
          1             2              3                    4        5
 LINE #
    1    01/23/83    45.2                                          70-C-2
    2    01/23/83    52.1                                          70-C-3
    3    01/23/83    43.5                                          70-C-4
    4    01/23/83    .2                                            PRECIP.
 TO CHANGE AN ITEM TYPE ITS LINE NUMBER, A COMMA
 AND ITS COLUMN NUMBER (E.G. 3,2 - LINE 3 COLUMN 2)
 OTHERWISE HIT RETURN
?
 PROJECT NAME(INPUT END TO QUIT)?
? TIONESTA LAKE
 IS THIS A NEW PROJECT?(Y OR N)
? N
 DO YOU NEED TO MODIFY PROJECT DATA?(Y OR N)
? N
  OPTIONS
   1... INPUT NEW INSTRUMENT
   2... MODIFY EXISTING INSTRUMENT/DATA VALUES
   3... INPUT READING VALUES
   4... BE PROMPTED FOR SETS OF READINGS
   5... NO MORE INSTRUMENTS TO ENTER
  INPUT THE DESIRED OPTION


? 3
 PIEZOMETER OR GAUGE NUMBER?
? 78-T-1
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 42.5
 SORRY, THE DATE IS NOT IN THE CORRECT FORMAT
```

When all desired readings have been entered, the user can move on to the next project.

Collect program editing capabilites.

```
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 12/23/82


READING?
? 42.5
```

(Continued)

(Sheet 6 of 8)

Table 11 (Continued)

```
 METHOD OF READING?(15 CHAR. MAX)
?
 REMARKS?(20 CHAR. MAX)
?
 DATE OF READING(INPUT 11/11/99 TO QUIT )(MM/DD/YY)
? 11/11/99
                      COLUMNS
          1           2             3                    4
 LINE #
    1     12/23/82    42.5
 TO CHANGE AN ITEM TYPE ITS LINE NUMBER, A COMMA
 AND ITS COLUMN NUMBER (E.G. 3,2 - LINE 3 COLUMN 2)
 OTHERWISE HIT RETURN
?
  OPTIONS
   1... INPUT NEW INSTRUMENT
   2... MODIFY EXISTING INSTRUMENT/DATA VALUES
   3... INPUT READING VALUES
   4... BE PROMPTED FOR SETS OF READINGS
   5... NO MORE INSTRUMENTS TO ENTER
  INPUT THE DESIRED OPTION


? 5
 PROJECT NAME(INPUT END TO QUIT)?
? END
 DATA ENTRY TERMINATED


/
```

(Continued)

Table 11 (Concluded)

```
 OLD,DATPIZ
/LIST
PIEZ LOAD DATA FILE
PROJ101NMICHAEL KIRWAN
PROJ102
PROJ103                                          935.0
PIEZ11170-C-1
PIEZ11270-C-1                                                    INOPER.
PIEZ11370-C-1
PIEZ11470-C-1
PIEZ11070-C-1
PIEZ11570-C-2     12/23/8243.80 TAPE        NONE                 2
PIEZ11570-C-2     01/23/8345.2                                   2
PIEZ11570-C-3     01/23/8352.1                                   2
PIEZ11570-C-4     01/23/8343.5                                   2
PIEZ115PRECIP.    01/23/83.2                                     1
PROJ101NTIONESTA LAKE
PIEZ11578-T-1     12/23/8242.5                                   2
/
```

(Sheet 8 of 8)

33. Example 3. This example, shown in Table 12, illustrates the use of the shortened prompts to enter piezometer data and reading values for an existing project. The prompt sequence selected in example 1 is used to enter the piezometer data. The user should become familiar with the data entry program before using this option. The cost of this session was $1.20.

Table 12

Data Entry Procedure with Shortened Prompts (Example 3)

```
 -INPPIZ
 DO YOU WANT SHORTENED PROMPTS?(Y OR N)
? Y


          PIEZOMETER DATA ENTRY SYSTEM

 PRNAME                    Short prompts, listing in Table 4.
? MICHAEL KIRWAN
 IS THIS A NEW PROJECT?(Y OR N)
? N
 DO YOU NEED TO MODIFY PROJECT DATA?(Y OR N)
? N
  OPTIONS
   1... INPUT NEW INSTRUMENT
   2... MODIFY EXISTING INSTRUMENT/DATA VALUES
   3... INPUT READING VALUES
   4... BE PROMPTED FOR SETS OF READINGS
   5... NO MORE INSTRUMENTS TO ENTER
  INPUT THE DESIRED OPTION


? 1
 PIZNM
? T.W.
 PLEASE SELECT ONE OF THE FOLLOWING OPTIONS:
      1 ........ USE THE DEFAULT PROMPT SEQUENCE
      2 ........ CREATE MY PROMPT SEQUENCE
      3 ........ USE THE TAILORED PROMPT SEQUENCE
      4 ........ KEEP THE CURRENT PROMPT SEQUENCE

 INPUT THE DESIRED OPTION!


? 3              Could also use option 2 to eliminate
 FEATRE          unwanted prompts.
? N/A
 STAT
? N/A
 OFFSET
? N/A
```

(Continued)

(Sheet 1 of 4)

Table 12 (Continued)

```
 TIPEL
? 0.0
 TOR
? 927.0
 PIZTYP
? T.W.
 PZSTAT
?
 THRSH4
?
OREVIEW OF INPUT
 LINE #     DB NAME          DATA VALUE
     1 .... PFD          .. N/A
     2 .... PSTA         .. N/A
     3 .... POFF         .. N/A
     4 .... TIPEL        .. 0.0
     5 .... TREL         .. 927.0
     6 .... TYPIEZ       .. T.W.
     7 .... PSAT         ..
     8 .... PTH4         ..
OTO CHANGE AN ITEM, TYPE ITS LINE #
 OTHERWISE HIT RETURN
?
 RDGDAT
? 09/23/1982
```

The shortened prompts option does not print out the required format for input data, MM/DD/YY.

```
READING?
? 929.9
 RDGMET
?
 REMARK
?
 RDGDAT
? 10/27/82


READING?
? 929.0
 RDGMET
?
 REMARK
?
 RDGDAT
? 11/11/99
```

(Continued)

(Sheet 2 of 4)

Table 12 (Continued)

```
                        COLUMNS
          1             2              3                        4
 LINE #
    1      09/23/19    929.9          Need to correct the date.
    2      10/27/82    929.0
 TO CHANGE AN ITEM TYPE ITS LINE NUMBER, A COMMA
 AND ITS COLUMN NUMBER (E.G. 3,2 - LINE 3 COLUMN 2)
 OTHERWISE HIT RETURN
? 1,1
 RDGDAT
? 09/23/82
 TO CHANGE AN ITEM TYPE ITS LINE NUMBER, A COMMA
 AND ITS COLUMN NUMBER (E.G. 3,2 - LINE 3 COLUMN 2)
 OTHERWISE HIT RETURN
?
ODO YOU WISH TO REVIEW VALUES AGAIN? (Y OR N)


? Y
                        COLUMNS
          1             2              3                        4
 LINE #
    1      09/23/82    929.9
    2      10/27/82    929.0
 TO CHANGE AN ITEM TYPE ITS LINE NUMBER, A COMMA
 AND ITS COLUMN NUMBER (E.G. 3,2 - LINE 3 COLUMN 2)
 OTHERWISE HIT RETURN
?
ODO YOU WISH TO REVIEW VALUES AGAIN? (Y OR N)


? N
  OPTIONS
   1... INPUT NEW INSTRUMENT
   2... MODIFY EXISTING INSTRUMENT/DATA VALUES
   3... INPUT READING VALUES
   4... BE PROMPTED FOR SETS OF READINGS
   5... NO MORE INSTRUMENTS TO ENTER
  INPUT THE DESIRED OPTION


? 5
 PRNAME
? END
 DATA ENTRY TERMINATED
```

(Continued)

(Sheet 3 of 4)

Table 12 (Concluded)

```
OLD:DATPIZ
/LIST
PIEZ LOAD DATA FILE
PROJ101NMICHAEL KIRWAN
PIEZ111T.W.       N/A        N/A      N/A
PIEZ112T.W.       T.W.
PIEZ113T.W.
PIEZ114T.W.
PIEZ110T.W.
PIEZ115T.W.       09/23/82929.9                                    6
PIEZ115T.W.       10/27/82929.0                                    6
/
```

(Sheet 4 of 4)

PART IV: DATA OUTPUT

34. The primary justification for using a data base management system is the flexible retrieval capability. System 2000 offers three methods of retrieving data: natural language, Report Writer, and procedural language interface (PLI). The natural language allows the user to browse or retrieve data by asking questions using the built-in system query language (Intel Corp. 1981a). This is the simplest and most flexible of the three retrievals because the user asks for the needed information during a time-sharing session. Each query or question requires a scan of the data base files. The report writer capability allows for the rapid retrieval of formatted reports from a single scan of the data base files (Intel Corp. 1981b). The reports can be developed interactively while using System 2000 (expensive) or separately from the data base using GENIUS to quickly build a file that is invoked when using the data base (Intel Corp. 1982). The report writer requires the user to have some knowledge of the data base query language plus the report writer features. The PLI retrievals are program statements containing FORTRAN programs that interface with the data base to gather data required by the program (Intel Corp. 1983). Some computer programming experience is required to generate these programs, but once written, the programs are easy to use. The next sections will describe the natural language retrieval methods, the interactive data modification procedure, the use of string retrievals, Report Writer retrievals, and the graphic output programs. At this time, there are no PLI output programs developed. All the data base element names and component numbers used in the examples are described in Table 1.

Data Base Access

35. A procedure file called GETDB is available to access the S2K data base. The commands used in this file are shown below:

```
GET,S2KGET/UN=CECE2K.
CALL,S2KGET.
S2K.
```

To use this procedure to access S2K data base, the following command is used which will result in the computer response shown (Note: The slash (/) is the computer command level prompt requesting user input. The question mark (?) is the data base prompt requesting user input.)

```
-GETDB
"S2K 2.80F"
84/04/06, 10.09.06. BEGIN SYSTEM 2000  VERSION 2.80F
```

The user is now in the System 2000 shell and must specify a password and data base name to access a particular data base. For the piezometer data base, the name is PIEZDB. Data bases can be accessed in two modes. The first mode, data base name (DBN mode), allows only one user to access the data base at a time. This mode must be used if data will be entered or modified. The second mode is the shared mode (SHARED DBN) which allows several individuals to access the data at once. In this mode only data retrievals are allowed. The following illustrates the first mode:

```
USER,XXX;DBN IS PIEZDB;
-556-    ASSIGNED   PIEZDB   1    65 84/03/28. 11.48.23.
---
```

The three-character password can be established in accordance with the user specifications.

36. System 2000 allows commands to be entered on multiple lines from the user's time-sharing terminal. All data base commands must end in a semicolon (;). The system will not execute any command until the semicolon is encountered. If multiple lines are used to input a command, always type a space at the beginning of each additional line.

37. When the user has finished working in the data base, the following command will close the data base and place the user in the computer command mode (slash prompt):

```
EXIT;
```

The following response will occur

```
-506-    CLOSED    PIEZDB    1    65 84/03/28. 11.48.23.
84/04/06. 10.08.51. END    SYSTEM 2000  VERSION 2.80F
STOP S2K
```

If the above command does not work the first time, the following will always work:

```
; EXIT;
```

If a query or command produces an unwanted listing, the user can sometimes stop the printing by using the "Break" or Interrupt" key on the terminal.

38. The data accessed by the System 2000 program reside in six direct access files. The files names are determined by the data base name, thus for the piezometer data base name of PIEZDB, the six files are TALPLAK, TBLPLAK, TCLPLAK, TDLPLAK, TELPLAK, and TFLPLAK.

Output Files

39. Sometimes the user would like to save some of the data base output in the computer files for future analysis or reference. This can be done by directing the output of a report file. This feature of the data base is very important when the user wants to generate graphic plots. Normally the report file, which will contain the results from the user's queries, is assigned to OUTPUT, which is the user's teletype terminal. However, the user can assign the results to an output file which can then be saved. The following sequence of commands is used:

```
REPORT FILE IS OUT1;
"Natural language Retrieval or Report Writer Commands"
REPORT FILE IS OUTPUT;
```

In this example the natural language retrieval or Report Writer output would be sent to file OUT1. The last statement returns the output to the user's terminal for any other commands. After the user has exited from the data base, the following command is used to make the output file permanent:

```
SAVE,OUT1
```

The file OUT1 is then accessed like any other file on the CDC computer.

Natural Language Retrievals

Description

40. The natural language retrievals are designed to allow the user to browse through or retrieve data. These retrievals are generally simple requests that the user initiates during a time-sharing session. Some requests can become complicated with titles and paging information, but the costs of these requests generally dictate that the Report Writer be used. To facilitate this feature of the data base, a query language has been developed that contains certain commands, clauses, and operators the data base understands. The following discussion of the query language is not an exhaustive reference, but various components are described that are used with this particular data base so that a user can interrogate this system. The user is referred to the System 2000 QUEST Manual (Intel Corp. 1981a) for more detailed information on the query language. All data base element names and component numbers used in the example in this section are described in Table 1.

41. The general format for natural language retrievals is

COMMAND OR ACTION VERB	OBJECT LIST AND OPERATORS	WHERE CLAUSE

The two principal action verbs are PRINT and LIST. The object list consists of the desired items of interest such as specific element names, component numbers, repeating groups, and system functions like MAXIMUM, MINIMUM, SUM, and COUNT. The components in the object list may be KEY or NON-KEY elements.

The user can use either component numbers or element names interchangeably as item identifiers; however, it is more cost efficient to use one or the other. The WHERE clause defines conditions which must be satisfied before a retrieval or updating operation will be performed. The variables used in the WHERE clause must be KEY variables and members of the same repeating group as the elements in the object list.

PRINT command.

42. The PRINT command allows the user to print any data from the data base in a sequential vertical list. Two examples would be:

```
PRINT PIEZ;
PRINT PIEZ WHERE PROJ-NAME EQ MICHAEL KIRWAN;
```

The first request will print all the data for all piezometers while the second request will print all the data for just the MICHAEL KIRWAN project. Besides requesting data by repeating groups, individual data elements (identified by data element name or component number) can be used as the following example illustrates:

```
PRINT PNO,PSTA,POFF,TIPEL WHERE PROJ-NAME EQ MICHAEL KIRWAN;
```

or by using a component number

```
PRINT C41,C45,C47,C49 WHERE C1 EQ MICHAEL KIRWAN;
```

This example would print the piezometer number, station, offset, and tip elevation for all piezometers associated with the MICHAEL KIRWAN project. The print command lists one data item with the data base component number per line. The data element name can be printed instead of the component number by using NAME option as shown in the following example which produces the same result as the previous example except that the element names are printed with the data instead of the component number:

```
PRINT/NAME/C41,PSTA,POFF,TIPEL WHERE C1 EQ MICHAEL KIRWAN;
```

Other examples of format control are discussed under "Format option". PRINT statements can be used with any correct WHERE clause, ORDERING clause, and BY lists. Examples of these will be shown when they are described later in this section.

LIST command.

43. The LIST command is similar to the print command except that the data values are spread across the page in a tabular format with the data element name at the top of each column. Several examples of LIST commands are:

```
LIST C1, PNO,PFD,TYPIEZ;

LIST PNO,PFD,TYPIEZ WHERE C1 EQ MICHAEL KIRWAN;

LIST C41, PFD,C59 WHERE C1 EQ MICHAEL KIRWAN;

LIST C41,C43,C59 WHERE C1 EQ MICHAEL KIRWAN;
```

The first request would list the project name, piezometer name, feature description, and type of piezometer for all projects in the data base. The other commands would retrieve data only for the MICHAEL KIRWAN project. The output from the second, third, and fourth examples are the same. The third example where component numbers and element names are intermixed in the object list is less efficient and costlier than the second or fourth example. As with the PRINT command, the LIST command can be used with WHERE clauses, ORDERING clauses, and BY lists. Examples will be shown when they are described later in the section. In addition, with the LIST command, titles, page headings, and footnotes can be added to the output along with formatting where the data appear on the page. These options dealing with page formatting will be described in the paragraph "Formatted LIST commands."

WHERE clause.

44. The WHERE clause specifies conditions which must be true before retrieval or updating operation can occur. The clauses consist of a series of phases that contain either the component number or element name, an operator, and the value or condition. The following are examples of the different types of operators that are available:

```
LIST C41 WHERE C1 EQ MICHAEL KIRWAN; (select piezometer names
                                        for one project).

LIST C41 WHERE C49 EQ 300.0; (select piezometer names for all
                               tip elevations equal to 300 ft).

LIST C41 WHERE C59 FAILS; (select piezometer names where there
                           is no entry for type of piezometer).

LIST C41 WHERE C59 EXISTS; (select piezometer names where there
                            is an entry for type of piezometer).

LIST C41 WHERE C49 GT 300.0; (select piezometer names for all
                               tip elevations greater than
                               300 ft).

LIST C41 WHERE C49 GE 300.0; (select piezometer names for all
                               tip elevations greater than or
                               equal to 300 ft).

LIST C41 WHERE C49 LT 300.0; (select piezometer names for all
                               tip elevations less than 300 ft).

LIST C41 WHERE C49 LE 300.0; (select piezometer names for all
                               tip elevations less than or equal
                               to 300 ft).
```

```
LIST C41 WHERE C49 NE 300.0; (select piezometer names for all
                               tip elevations not equal to
                               300 ft).

LIST C41 WHERE C49 SPANS 200.0*300.0; (select piezometer names
                                       for all tip elevations
                                       equal to 200 through
                                       300 ft).

LIST C41 WHERE C49 EQ 200.0*300.0; (same as above).

LIST C41 WHERE C49 NE 200.0*300.0; (select piezometer names for
                                    all tip elevations not
                                    equal to 200 through 300 ft).
```

The WHERE clause can be combined using AND and OR connectors and using parentheses to group conditions for clarity. AND connectors are used when multiple conditions must be true, while OR connectors are used when only one of several conditions must be true. This gives the user the capability of asking some complex questions as the following example indicates:

```
LIST C41,C91,C93 WHERE C1 EQ MICHAEL KIRWAN AND (C41 EQ 70-C-1
OR C41 EQ 70-C-2) AND C93 SPANS 970.0*972.0;
```

When using WHERE clauses, the user must ensure the variables in the clauses are KEY variables and that they are in the same repeating group as at least one variable in the object list. If multiple lines are used to input a command, always type a space at the beginning of each additional line.

DITTO command.

45. After successfully typing a long query and obtaining the desired results, the user would like the same information for a different WHERE clause condition. The DITTO command causes the previous command on the left of the WHERE clause to be reused. To obtain the same information as shown above for piezometers 70-C-3 the following would be entered:

```
DITTO WHERE C1 EQ MICHAEL KIRWAN AND C41 EQ 70-C-3 AND C93 SPANS
970.0*972.0;
```

SAME command.

46. The SAME command does the same as the DITTO command except that it works on the right side of the WHERE clause. The following example illustrates this command:

```
LIST C41 WHERE C1 EQ MICHAEL KIRWAN AND C59 EQ OPEN STANDPIPE;
LIST PFD,PSTA,TIPEL WHERE SAME;
```

Both the DITTO and SAME commands can be combined in the same LIST or PRINT command. When this occurs, the report is duplicated. This may be useful if some printout was lost due to transmission error or some other problem. Also the SAME command has an additive capability; thus the user can narrow data of interest as shown in the following example:

```
LIST PNO,TIPEL,PSTA WHERE PROJ-NAME EQ MICHAEL KIRWAN AND
  TYPIEZ EQ OPEN STANDPIPE;

DITTO WHERE SAME AND TIPEL EQ 310.*320.;
```

The first example defines the data group to a project and a type of piezometer. The second query further narrows the data group to those with tip elevations 310 through 320. If the OR connectors are used instead of the AND connectors, the data group can be enlarged.

ORDERING statements.

47. The ORDERED BY clause allows the user to sequence the output in ascending (low) or descending (high) order according to data elements associated with the record. Ascending order is assumed. For example:

```
LIST C41,C91,C93,ORDERED BY LOW C91 WHERE C41 EQ 70-C-1;
```

Will list the dates and readings for piezometer 70-C-1 in ascending order of the dates. If descending order is desired, it is recommended that the HIGH and LOW modifiers be attached in front of each data element as shown below:

```
LIST C41,C91,C93,ORDERED BY LOW C91,HIGH C93 WHERE. . .
```

The ORDERED BY clause can also be used in the PRINT command. There must be a comma between the list of data elements and the ORDERED BY clause.

System function.

48. In addition to listing (or printing) the data elements themselves, System 2000 can generate the following statistical information:

COUNT(PNO) - count how many piezometer names exist

MIN(TIPEL) - determine the minimum tip elevation

MAX(TIPEL) - determine the maximum tip elevation

AVG(PREAD) - determine the average of the piezometer readings

SUM(PREAD) - generate the summation of the piezometer readings

SIGMA(PREAD) - generate the standard deviation of the piezometer readings

These functions can only be used in the LIST or PRINT commands as the following example illustrates, not in a WHERE clause.

```
LIST COUNT(PNO),MIN(TIPEL),MAX(TIPEL),AVG(TIPEL),SUM(TIPEL),
  SIGMA(TIPEL) WHERE PROJ-NAME EQ MICHAEL KIRWAN;
```

Format option.

49. The user may control the format of the PRINT retrievals by specifying a format option other than the default option of tree, stubs, and component numbers. The various options are:

a.) STUB - prints element name or component number before value.

STUB SUPPRESS - deletes element name or component number before value.

b.) NUMBER - uses component number as stub

NAME - uses element name as stub

c.) TREE - prints a repeating group and all lower data associated with the repeating group.

GROUP - prints only the requested repeating group.

The following examples illustrate the use and results of format options.

```
? PRINT/GROUP/C40 WH C41 EQ 70-C-1;
      41* 70-C-1
      43* EMB.
      45* 66+00
      47* 15U/S
      49*  936.0
      51* 1015.0
      59* OPEN STANDPIPE
      61* OPER.
      63* 01/21/1983
      88*    0.0
---
? PRINT/NAME/C40 WH C41 EQ 70-C-1;
      PNO* 70-C-1
      PFD* EMB.
      PSTA* 15U/S
      TIPEL* 936.0
      TREL* 1015.0
      TYPIEZ* OPEN STANDPIPE
      PSAT* OPER.
      PDI* 01/21/1983
      PTH4/*   0.0
---
```

```
? PRINT/STUB SUPPRESS/C40 WH C41 EQ 70-C-1;
      70-C-1
      EMB.
      66+00
      15U/S
       936.0
      1015.0
      OPEN STANDPIPE
      OPER.
      01/21/1983
         0.0
---
```

TALLY command.

50. The TALLY command provides a summary of unique values and occurrences of KEY data elements. WHERE clauses are not allowed. There are two types of TALLY commands, ALL and EACH. The following information can be obtained for each of these types:

a.) MAXIMUM AND MINIMUM VALUES OF REQUESTED ELEMENT (/ALL/)

b.) NUMBER OF OCCURRENCES OF THE ELEMENTS REQUESTED ELEMENT (/ALL/)

c.) NUMBER OF UNIQUE VALUES OF THE ELEMENTS REQUESTED ELEMENT (/ALL/)

d.) THE UNIQUE VALUES FOR REQUESTED ELEMENT (/EACH/)

e.) THE NUMBER OF OCCURRENCES OF EACH UNIQUE VALUE FOR REQUESTED ELEMENT (/EACH/)

The following examples illustrate the two types of TALLY commands.

TALLY/ALL/PNO; -	Prints the element name, minimum value, maximum value, number of unique values and total number of occurrences.
TALLY/EACH/TYPIEZ; -	Prints the element name and a table of frequency versus unique value, then the number of unique values and total number of occurrences. (useful for checking misspelled names)

WHERE-clauses are not allowed in a TALLY command.

DESCRIBE command.

51. The DESCRIBE command will print the System 2000 directory of data elements. Component numbers and element names are listed along with some other attributes that are listed in Table 1. The command to list the entire data base is illustrated below:

DESCRIBE;

To list only part of the data base, the following command would be used:

DESCRIBE 40 THRU 90;

Abbreviations.

52. System 2000 allows users to use a number of abbreviations and shorthand notations to simplify their queries. The valid abbreviations are:

TA = TALLY

LI = LIST

PR = PRINT

WH = WHERE

OB = ORDERED BY

DI = DITTO

SA = SAME

CH = CHANGE

Formatted LIST command.

53. The LIST command can allow you to list information in many different ways by using the TITLE options. These options would generally be used for reports that require sorted lists of various information from the data base. Three options can be defined in the TITLE clause. These options are:

(1) D(NN)TEXT - ADD A REPORT HEADING AT THE TOP OF THE REPORT. THE CURRENT DATE WILL BE CENTERED UNDER THE 'TEXT' HEADING. NOTE: DO NOT USE ANY COMMAS (',') IN YOUR HEADING.

(2) F(MM)TEXT - ADD A REPORT FOOTING AT THE BOTTOM OF EACH PAGE AND SPECIFY A PAGE SIZE.

(3) COLUMN-HEADERS - MODIFY THE HEADERS ON EACH COLUMN OF OUTPUT TO PRINT MULTI-LINE, USER-SPECIFIED COLUMN HEADERS INSTEAD OF DATA ELEMENT NAMES. THE USER WILL NEED TO REFER TO THE FULL SYSTEM 2000 DOCUMENTATION FOR DETAILS ABOUT THIS OPTION.

The following examples illustrate the page heading and footnote options:

LIST/TITLE D(NN)TEST/ ...;

LIST/TITLE F(MM)TEXT/ ...;

D(NN) indicates you want a descriptive heading at the top of the page. The current data will be printed centered under your text heading. If the TEXT is blank, only the date will be printed.

The value NN is the starting position (in characters from the left) of the beginning character of TEXT. F(MM) without TEXT defines a page size of MM (try 55). The TEXT will be printed following one blank line at the bottom of each page and will start in the leftmost print column. A bug in System 2000 causes the first character of the footing not to print. Use a decimal (.) as the first character and there will be no problems. Headings, footings, and column-headers can be combined in one LIST command.

Example 4

54. The following data base session, shown in Table 13, illustrates some of the data sets selected by the natural retrievals discussed in the previous section. To limit the amount of output generated, some of the WHERE clauses are more restrictive in the examples than in the previous descriptions. Part of this section accessed the Pittsburg District data base. The total cost for the session was about $5.30.

Table 13

Data Base Natural Language Retrievals

```
? USER:XXX,DBN IS PIEZDB;
-556-   ASSIGNED   PIEZDB
---
? TALLY/ALL/C41;
**********************
 ELEMENT-      PNO
**********************
 MINIMUM-      A.T.
----------------------
 MAXIMUM-      9-AC
----------------------
       50  UNIQUE VALUES
----------------------
       50  OCCURRENCES
----------------------
---
? LI C41 WH C45 SPANS 45+50*47+00;
   PNO
***
* 70-C-4
* 70-C-6
* 70-C-5
* 70-C-1
* 29-AC
* 29-BC
* 11-AC
* 70-C-2
* 70-C-3
---
? LI C41,C45,C47 WH SAME;
   PNO           PSTA        POFF
***
* 70-C-4        46+00       220D/S
* 70-C-6        46+00       320D/S
* 70-C-5        46+00       220D/S
* 70-C-1        46+00       15U/S
* 29-AC         46+14       600D/S
* 29-BC         46+14       600D/S
* 11-AC         46+40       275D/S
* 70-C-2        46+00       120D/S
* 70-C-3        46+00       120D/S
---
```

(Continued)

(Sheet 1 of 7)

Table 13 (Continued)

```
? LI C41:C91:C93:OB LOW C91 WH C41 EQ 70-C-4 AND C91 SPANS
 ---
?  09/01/1982*12/30/1982;
   PNO                PDTRD       PREAD
 ***
 * 70-C-4         09/23/1982       932.0
 * 70-C-4         10/27/1982       931.7
 * 70-C-4         11/24/1982       932.1
 * 70-C-4         12/23/1982       931.9
 ---
? DITTO WH C41 EQ POOL AND C91 SPANS 09/01/1982*12/30/1982;
   PNO                PDTRD       PREAD
 ***
 * POOL           09/23/1982       976.3
 * POOL           10/27/1982       975.8
 * POOL           11/24/1982       976.6
 * POOL           12/23/1982       979.5
 ---
? LI C41:C91:C93:OB LOW C41 WH C45 SPANS 45+50*47+00
 ---
?  AND C91 SPANS 04/01/1983*06/30/1983;
   PNO                PDTRD       PREAD
 ***
 * 11-AC          04/26/1983       946.4
 * 11-AC          06/29/1983       945.2
 * 11-AC          05/25/1983       945.7
 * 29-AC          05/25/1983       941.2
 * 29-AC          06/29/1983       941.2
 * 29-AC          04/26/1983       941.2
 * 29-BC          06/29/1983       959.5
 * 29-BC          05/25/1983       970.2
 * 29-BC          04/26/1983      1000.5
 * 70-C-2         06/29/1983       932.0
 * 70-C-2         04/26/1983       932.4
 * 70-C-2         05/25/1983       932.5
 * 70-C-3         05/25/1983       942.4
 * 70-C-3         06/29/1983       941.0
 * 70-C-3         04/26/1983       942.9
 * 70-C-4         06/29/1983       932.0
 * 70-C-4         05/25/1983       932.1
 * 70-C-4         04/26/1983       932.3
 * 70-C-5         06/29/1983       944.1
 * 70-C-5         04/26/1983       944.7
 * 70-C-5         05/25/1983       944.8
 * 70-C-6         04/26/1983       932.5
 * 70-C-6         05/25/1983       932.7
 * 70-C-6         06/29/1983       932.6
 ---
```

(Continued)

(Sheet 2 of 7)

Table 13 (Continued)

```
? PR/GROUP/C40 WH C41 EQ 29-BC;

   41* 29-BC
   45* 46+14
   47* 600D/S
   49*  838.7
   51*  944.4
   59* GAUGE ON STANDPIPE
   61* OPER.
   88*    0.0
 ---
```

(Continued)

(Sheet 3 of 7)

Table 13 (Continued)

```
? TALLY/EACH/C1:
**********************
 ELEMENT-     PROJ-NAME
**********************
FREQUENCY   VALUE
----------------------
        1       ALLEG.L/D 2
        1       ALLEG.L/D 3
        1       ALLEG.L/D 4
        1       BERLIN LAKE
        1       CONEMAUGH LAKE
        1       CROOKED CREEK LAKE
        1       DASHIELDS L/D
        1       EAST BRANCH LAKE
        1       EMSWORTH L/D
        1       HANNIBAL L/D
        1       HILDEBRAND L/D
        1       KINZUA DAM
        1       LOYALHANNA LAKE
        1       MAHONING LAKE
        1       MAXWELL L/D
        1       MICHAEL J. KIRWAN DAM
        1       MONTGOMERY L/D
        1       MON.L/D 2
        1       MON.L/D 3
        1       MON.L/D 4
        1       MON.L/D 7
        1       MORGANTOWN L/D
        1       MOSQUITO CREEK LAKE
        1       NEW CUMBERLAND L/D
        1       OPEKISKA L/D
        1       PIKE ISLAND L/D
        1       SHENANGO LAKE
        1       TIONESTA LAKE
        1       TYGART LAKE
        1       UNION CITY RES.
        1       WOODCOCK LAKE
        1       YOUGHIOGHENY LAKE
----------------------
       32  UNIQUE VALUES
----------------------
       32  OCCURRENCES
----------------------
```

(Continued)

(Sheet 4 of 7)

Table 13 (Continued)

```
---
? LIST COUNT C41 WH C1 EQ TIONESTA LAKE;
      CNT PNO
***
*          24
---
? LI C41 WH C1 EQ TIONESTA LAKE;
   PNO
***
* 78-T-1
* 78-T-2
* 78-T-3
* 78-T-4
* POOL
* T.W.
* 78-T-5
* 78-T-6
* 78-T-7
* 78-T-8
* 78-T-12
* 78-T-13
* 78-T-14
* 78-T-15
* 78-T-16
* 78-T-11
* 78-T-10
* 78-T-9
* 78-T-17
* PRECIP.
* WEATH.
* A.T.
* WEIR 1
* WEIR 2
---

? LI MAX C91:MIN C91 WH C1 EQ TIONESTA LAKE AND C41 EQ 78-T-1;
     MAX PDTRD     MIN PDTRD
***
* 12/31/1983    08/10/1919
---
```

(Continued)

(Sheet 5 of 7)

Table 13 (Continued)

```
? LI C41,C91,C93 WH  C91 EQ 08/10/1919;
     PNO                  PDTRD       PREAD
   ***
   * 78-T-1          08/10/1919      1069.5


  ? LI C41,C91,C93 WH C93 EQ 1069.5;
   ---

     PNO                  PDTRD       PREAD
   ***
   * 78-T-1          01/10/1979      1069.5
   * 78-T-1          08/10/1919      1069.5


?CH C93 EQ 6666.6*WH C1 EQ TIONESTA LAKE AND C41 EQ 78-T-1
  ---
 ?  AND C91 EQ 08/10/1919;
  -       1  SELECTED DATA SETS -
  ---
 ? LI C91,C93 WH C91 EQ 08/10/1919;
         PDTRD       PREAD
  ***
  * 08/10/1919      6666.6
  ---
 ? CH C91 EQ 08/10/1983*WH C93 EQ 6666.6;
  -       1  SELECTED DATA SETS -
  ---
 ? CH C93 EQ 1069.5*WH C1 EQ TIONESTA LAKE AND C41 EQ
  ---
 ?  78-T-1 AND C91 EQ 08/10/1983;
  -       1  SELECTED DATA SETS -
  ---
 ?
```

(Continued)

(Sheet 6 of 7)

Table 13 (Concluded)

```
? LI C41;C91;C93 WH C1 EQ TIONESTA LAKE AND C91 FAILS;

    PNO                 PDTRD       PREAD
  ***
  * 78-T-1
  ---                                1070.0
? ADD C91 EQ 04/28/1983*WH C1 EQ TIONESTA LAKE AND C41 EQ 78-T-1
  ---
?  AND C93 EQ 1070.0;
  -       1  SELECTED DATA SETS -
  ---

 LI C41;C91;C93 WH C1 EQ TIONESTA LAKE AND C41 EQ 78-T-1
  ---
 ?  AND C93 EQ 1070.0;
    PNO                 PDTRD       PREAD
  ***
  * 78-T-1          04/28/1983      1070.0
  ---


 EXIT;
-506-   CLOSED     PIEZDB                      18 21588 84/06/08. 14.43.22.
 84/06/08. 14.47.48. END   SYSTEM 2000  VERSION 2.60F
STOP S2K
```

(Sheet 7 of 7)

Interactive Data Modifications

55. Data in the piezometer data base can be modified either with the data entry program described in Part III or with the System 2000 natural language commands described in this section. The data entry program is capable of editing the project and piezometer data levels. The reading repeating group data can only be modified by the natural language commands. There are a number of commands that can either add or modify data when the user is working on line with the data base. Of these, there are three commands that the user of this data system should be aware of; they are ADD, CHANGE, and REMOVE. Each of these commands will be described in detail below. These three commands deal with adding to or modifying existing data groups; if the user wants to insert new data groups, he should either use the data entry program described in Part III or refer to the System 2000 documentation. The data base can be damaged in this interactive mode, and a backup copy is recommended (see Appendix A). Before using these commands, the user must understand the WHERE clause information discussed in paragraph 43 because each of these commands will modify or add data as specified; thus, each command must uniquely identify the data set (project name, piezometer name, or reading date) so that only the intended data is changed. After each command is executed, the computer will respond with the number of selected data sets that were modified. It is strongly recommended that before a data modification, the CHANGE or REMOVE command is replaced with a LIST command which is then executed to ensure that only one selected data set will be modified. If more data sets are involved than the user expected, he needs to determine what else needs to be specified in the WHERE clause so that the data set to be modified is uniquely identified.

ADD command.

56. The ADD command is used to add one or several elements of data to an existing data group where no data presently exist. This command is used when a few elements of data need to be added to a data group. The following example illustrates format to add one component, in this case, the date of installation to the piezometer's data:

```
ADD C63 EQ 01/21/1983*WHERE C1 EQ MICHAEL KIRWAN AND C41 EQ
70-C-1;
-        1  SELECTED DATA SETS -
---
```

The computer response indicates how many data sets were modified. To add more than one element the following example illustrates the procedure for two elements:

```
ADD C40 EQ 55*1.5*57*CLAY*END*WHERE C41 EQ 70-C-1;

-        1  SELECTED DATA SETS -

---
```

The data element names and component numbers are defined in Table 1. All data base commands must end with a semicolon (;), and the asterisk (*) is the system separator. The equal operation (EQ) is the only valid operator for the ADD command. If a value exists for an element and another value is attempted to be added, the system would tell the user zero data sets were selected. When multiple elements are added, the word "END*" must appear after the last value to be added; otherwise, the command will not be accepted. Multiple elements that are not in the same repeating group cannot be added in the same command.

CHANGE command.

57. The CHANGE command is used to modify one or several existing data element values. This command is used to correct errors that are found in the data base. Two examples of the CHANGE command are:

```
---

? CHANGE C93 EQ 933.4*WHERE C1 EQ MICHAEL KIRWAN AND C41 EQ

---

? 70-C-2 AND C91 EQ 04/26/1983;

CHANGE C90 EQ 91*04/27/1983*93*110.4*END*WHERE C1 EQ MICHAEL

KIRWAN AND C41 EQ 70-C-2 AND C97 EQ INOPER.;
```

All the nomenclature is either defined in Table 1 or for the ADD command. The value after the EQ is always the corrected value. The first example will change just the reading value, while the second example will change both the date and reading value. All the details of the CHANGE command are the same as the ADD command. As mentioned previously, it is strongly recommended that before any CHANGE command is executed, the CHANGE command should be replaced with a LIST command so that the user can ensure that only one data set will be modified. The following sequence of commands should be used:

```
? LIST C91,C93 WHERE C1 EQ MICHAEL KIRWAN AND

  C41 EQ 70-C-1 AND C93 EQ 932.4;
```

computer response:

```
            PDTRD          PREAD
***
*           04/26/1983     932.4
```

The user knows that the values to be changed are uniquely identified. If more than one value was listed, the user would have to modify the WHERE clause until only the value of interest was listed. The next command is the CHANGE command as described earlier. The following procedure can be used if the elevation or date is not able to uniquely identify a reading.

```
? LIST C91,C93 WHERE C1 EQ MICHAEL KIRWAN AND C41 EQ 70-C-1 and
  C93 EQ 932.4;
  PDTRD                    PREAD
***
*  01/23/1983              932.4
*  04/26/1983              932.4
```

Since 932.4 is not a unique number, it must be changed so that it can be used to qualify the reading date (04/26/1983). The next command is:

```
? LIST C91,C93 WHERE C1 EQ MICHAEL KIRWAN AND C41 EQ 70-C-1 AND
  C91 EQ 04/26/1983
  PDTRD                    PREAD
***
*  04/26/1983              932.4
```

The date can be used to uniquely define the reading value. Thus, by changing the reading value the reading can be uniquely identified so that the date can be changed. The command sequence for this procedure is as follows:

```
CHANGE C93 EQ 999.9*WHERE C41 EQ 70-C-1 AND C1 EQ MICHAEL KIRWAN
AND C91 EQ
---
? 04/26/1983;
- 1 SELECTED DATA SETS -
```

The reading value 999.9 is now unique, and the reading date can be changed.

```
CHANGE C91 EQ 04/16/1983*WHERE C1 EQ MICHAEL KIRWAN AND C41 EQ
---
?  70-C-1  AND C93 EQ 999.9;
-  1  SELECTED DATA SETS -
---
```

The reading date has been corrected, the user must now change 999.9 back to its original value.

```
?  CHANGE C93 EQ 932.4*WHERE C1 EQ MICHAEL KIRWAN AND C41 EQ
---
?  70-C-1  AND C91 EQ 04/16/1983;
-  1  SELECTED DATA SETS -
```

If the CHANGE command did not have sufficient qualifications, the following would happen:

```
---
?  CHANGE C93 EQ 932.4*WHERE C91 EQ 04/16/1983;
-  50  SELECTED DATA SETS -
?
```

All reading values for every project and every piezometer with the date 04/16/1983 was changed to 932.4, which include the one the user wanted to change and forty nine others. If this should happen, call your system coordinator.

REMOVE command.

58. The purpose of the REMOVE command is to delete data from the data base. The user is reminded of the importance of uniquely defining the data to be removed so that other data is not lost. An example of the REMOVE command is:

```
REMOVE C88 WHERE C1 EQ MICHAEL KIRWAN AND C41 EQ 70-C-1;
```

The nomenclature has been previously defined. This example removes the fourth threshold value for piezometer 70-C-1 from the data base. Multiple data elements cannot be removed by using one command; however, the following illustrates how a complete reading is removed.

```
REMOVE TREE PRED WHERE C1 EQ MICHAEL KIRWAN AND C41 EQ 70-C-1
AND C91 EQ 04/26/1984;
```

Here again the use of the LIST command before the REMOVE command is strongly recommended.

String Retrievals

Description

59. A frequent or long command can be stored as a component of the data base and executed by specifying only the component number. These user-defined components which alleviate the user from having to repeatedly enter a long command are called strings. The format for specifying these components is:

```
COMPONENT   *   STRING    (STRING  ($  Natural language  $))
 NUMBER         NAME                    command
```

The dollar signs are the same as another set of parentheses. By using the above form, the semicolon ending the command is embedded in the component and is not necessary when executing the string. To find out whether there are any strings associated with the user's data base, the following natural language command is used:

```
DESCRIBE  STRINGS;
```

There are two types of strings. The difference between the two is the information necessary to execute the retrievals.

Simple string.

60. The simple string retrieves data according to a natural language command that does not need any user input. An example for this type of string is:

```
1000*SIMSTRG(STRING(LIST C1,C41,MAX(C91);))
```

This string command will list the latest reading date for all piezometers of all the projects in the data base. To execute the string, one of the following commands is specified:

```
*C1000*
```

or

```
*SIMSTRG*
```

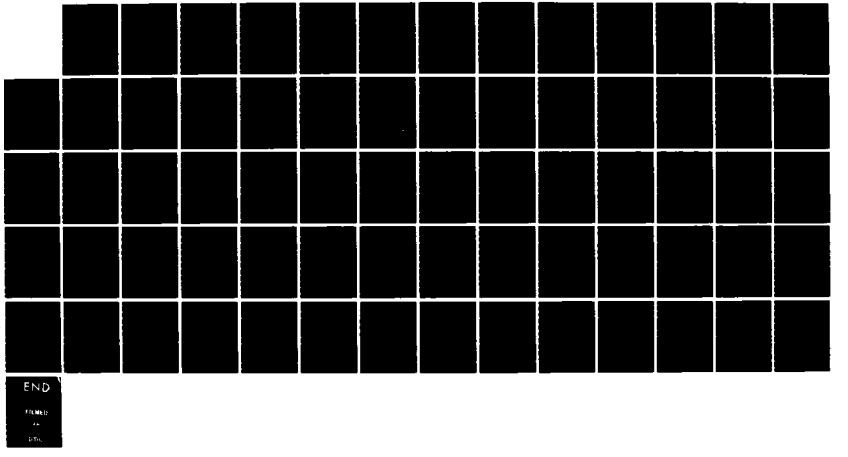
Extended string.

61. The extended string retrieves data according to a natural language command which requires user input which is substituted for the variables in the string. An example of this type of string is:

```
2000*EXTSTRG(STRING(LIST C41,C91,C93,OB LOW C91
WHERE C1 EQ *1* AND C41 EQ *2* AND C91 SPANS *3*;))
```

AD-A163 264 PIEZOMETER DATA BASE PACKAGE USER'S GUIDE(U) ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MS GEOTECHNICAL LAB E V EDRIS ET AL. OCT 85 2/2

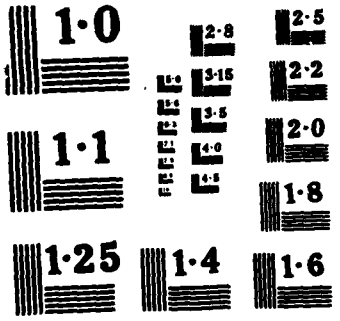
UNCLASSIFIED WES/IR/GL-85-2 F/G 5/2 NL



END

FILMED

DTIC



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This string command will list the piezometer name, reading dates, and readings in ascending order of the date within a prescribed period. The user must specify the actual argument to replace the symbolic arguments. For this example, the user must specify the project name (*1*), the piezometer name (*2*) and the beginning and ending dates for the report (*3*). For this case the last argument actually consists of two dates separated by the system separator (*). To operate this string one of the following commands is specified:

*C2000 (project name, piezometer name, begin date * end date)

or

*EXTSTRG (project name, piezometer name, begin date * end date)

Example 5

62. Table 14 (Example 6) illustrates how strings are used.

Table 14
Data Base String Retrievals (Example 6)

```
-GETDB

++ CORPS S2K VERSION 2.8 ++

85/07/05. 10.42.48. BEGIN SYSTEM 2000  RELEASE M2.80D
---
? USER.XXX;DBN IS PIEZDB;
-556-   ASSIGNED   PIEZDB
---

? DESCRIBE STRINGS;
 2000*  EXTSTRG (STRING (LIST C41,C91,C93,OB LOW C91 WH C1 EQ *1* AND C
        41 EQ *2* AND C91 SPANS *3*;))
 1000*  SIMSTRG (STRING (LIST BY C0,C1,MAX(C91);))
---

? *C1000*
   PROJ-NAME
***
* MICHAEL KIRWAN                              12/29/1983
---

? *EXTSTRG(MICHAEL KIRWAN;70-C-4;09/01/1982*12/30/1982)
   PNO                PDTRD       PREAD
***
* 70-C-4          09/23/1982       932.0
* 70-C-4          10/27/1982       931.7
* 70-C-4          11/24/1982       932.1
* 70-C-4          12/23/1982       931.9
---
? EXIT;
```

Report Writer Retrievals

Description

63. After the user is familiar with the natural language retrievals, there are many results or data groupings the user would like to generate. The Report Writer feature of the data base was designed to generate frequently used output formats (Intel Corp. 1981b). The Report Writer will generate a set format and allow the user to select the data groups of interest. The data base files are scanned once for each report; whereas, the files are scanned for each interactive command. The difference between string and Report Writer retrievals is that the Report Writer allows for more complexity in the output format and in the manipulation of the data. The user is referred to the System 2000 GENIUS program (GET,GENIUS/UN=CECE2K; GENIUS and USE OPTIONS 88 and 89) or the User's guide (Intel Corp. 1982) for easy preparation of a report writer file.

64. At the present time, there is only one Report Writer file developed for the piezometer data base system. This file called MAXDATE will list the last reading date for specified projects. This particular file is similar to the string retrieval example. The data generated by this file will assist the District/Project personnel in keeping track of reading schedules.

65. To execute any Report Writer file, the following two step procedure is necessary:

a. File availability. All files on Control Data System are stored on disks; thus any file the user accesses must be put in the user's work space. To put files in this work space, the computer must "GET" the files from the disk storage. The recommended method of putting files in the user's work space is to issue a GET command before the data base command file is executed. An example of the first step in this procedure is:

```
GET,MAXDATE/UN=CEROK2
-GETDB
```

This will put the Report Writer file MAXDATE in the user's work space along with accessing the data base. Once the file is in the user's work space, the data base can access the file using the second step described below.

b. Report generation. When the user is working interactively with the data base, the system is initially reading all commands from the terminal which is considered INPUT. If the user wants to

have the data base read commands from a file, the following command is used:

COMMAND FILE IS (file name);

The file name is supplied by the user from the list of files available in the work space. If the file contains a series of natural language retrieval commands, the data base will execute the commands in the order they appear in the file. However, if the file is a Report Writer file, the data base will compile the commands and execute the report if a GENERATE statement is included in the file. If this statement is not in the file, the user must enter it after the report is compiled. A GENERATE statement will select the data the user is interested in obtaining. It can contain a WHERE clause to select the data as illustrated in the following example:

GENERATE (report name) WHERE (valid where clause);

The report name is the name given to the Report Writer format.

Example

66. The following example illustrates the use of a Report Writer file that contains natural language commands:

```
GET,MAXDATE
/-GETDB
"S2K 2.80F"
?  USER,XXX;SHARED DBN IS PIEZDB;
---
?  COMMAND FILE IS MAXDATE;
PROJECTS AND DATE OF LAST READING
        84/05/10.
  PROJ-NAME
***
*  TIONESTA LAKE                          12/31/1983
***
*  BERLIN LAKE                            12/27/1983
***
*  CONEMAUGH LAKE                         12/23/1983
***
*  CROOKED CREEK LAKE                     03/08/1984
```

```
***
*  EAST BRANCH LAKE                    01/23/1984
***
*  EMSWORTH L/D                        01/16/1984
***
*  MONTGOMERY L/D                      09/20/1984
***
*  NEW CUMBERLAND L/D                  03/07/1984
***
*  PIKE ISLAND L/D                     03/27/1984
***
*  MON,L/D 2                           03/23/1984
***
```

Graphic Plots

67. The five graphic display programs available for use with the piezometer data base package are:

a. PZ, to plot piezometer time histories of selected piezometers.

b. PZPRO, to plot piezometer readings on cross sections.

c. BORMAP, to plot the location of piezometers.

d. BORCON, to contour selected water surface data.

e. GENXY, to plot column data in x-y format.

Programs c. and d. are described in detail by Strohm and Palmerton (1984). The details of these programs are included for completeness of the piezometer package. Program e. was described by Edris, Hammer, and Vanadit-Ellis (1983) and is also included for completeness of the package. Two steps are required to use all of the plot programs. The first step is to create a data file of the desired data from the data base using natural language retrievals. The second step is to access the desired program. The first two programs and the last one will only plot on graphics terminals, while the other two programs have the option of plotting at the graphics terminal and/or directing plots to a drum plotter. The programs require the use of a Tektronix type graphics terminal. The programs use the CE Graphics Compatibility System (GCS) with library routines that are outside the programmer's control. Thus, some inconveniences are encountered, such as unexpected screen erasures after an initial

prompt and after completion of drum plot option prompts. Instructions to overcome this problem are given in the detailed descriptions. This section describes the capabilities and use of each program and gives examples of their use.

Piezometer Time History Plots

68. Capabilities. The piezometer time history plot program, PZ, is an interactive program that requires user input before a plot can be generated. Multiple plots can be placed vertically on a page with several piezometer readings on each scale. The time scale is initially automatically set by the largest time period of any instrument in the data file. The user can vary this scale, and the vertical scale after the initial plot is generated. Different line symbols are used for multiple instruments. The individual data points are indicated by an X. Also, special symbols are used to represent dry, frozen, and zero pressure readings. A bar chart will be generated for the precipitation only if it is on the bottom vertical scale.

69. Data file. The data file for use with PZ must be generated with the LIST command. Once the user has specified a report file name (paragraph 39), the following command is used:

```
LIST C41,C91,C93, OB LOW C91 WHERE C1 EQ (project name)
AND C41 EQ (piezometer name) AND C91 SPANS (dates for plot);
```

This command is repeated for each piezometer that will be included on the plot. The user must keep track of the number of piezometers and the sequence of the data in the report file.

70. Plot execution. Access to and execution of PZ are accomplished with the following command:

```
/BEGIN,,PZ
```

71. Program prompts. The program prompt and the user response are described below.

a. NUMBER OF SCALES ON THIS PAGE? There can be up to three vertical scales per page.

b. HOW MANY CURVES ON THE SCALE? (THE NUMBER OF PIEZOMETER PER SCALE) If there is only one vertical scale, then five piezometers can be plotted. However, if there is more than one vertical scale, then a maximum of three piezometers can be plotted on each scale.

c. AUTOMATIC HARD COPIES? (Yes or no)

d. NAME OF DATA FILE?

e. TITLE FOR PLOTS?

f. Y-AXIS LABEL?

After the initial plot, the program prompts the user about replotting at a different time scale and/or vertical scale. If another plot is chosen, the user can input the minimum-maximum and interval for each scale. If the user chooses not to replot the data, additional data files can be plotted or the program can be terminated.

72. Example. Table 15 shows an example of data file generation and use of the PZ program.

Piezometer cross-section plots

73. Capabilities. The piezometer cross-section plot program, PZPRO, will plot the piezometers for a given station on a user-supplied cross section. Up to three elevation readings can be specified for the piezometers and the pool level. Cross sections can be entered during the interactive session or read in from a data file. The location of the piezometers on the cross section is determined by the offset value since the station is constant. A legend is included for identification of reading dates and piezometers.

74. Data files. The user may elect to create the cross-section data file before using the plot program. This file can be created interactively using the plot program; however, since there is no means of correcting erroneous input values, it is recommended that the user create the file separately. To create this file the following sequence utilizing the system editor is used:

```
/NEW,POINTS
/XEDIT
?? (Carriage return for input mode)
?2 (Total number of profile or stata in this cross section)
?10 (Number of x & y coordinates in the first profile)
```

Table 15
Piezometer Time History Plot

OLD,XYPZ
/LIST

PNO	PDTRD	PREAD
# 78-T-1	01/01/1983	1068.6
# 78-T-1	01/02/1983	1068.4
# 78-T-1	01/03/1983	1068.5
# 78-T-1	01/04/1983	1068.6
# 78-T-1	01/05/1983	1068.4
# 78-T-1	01/06/1983	1068.2
# 78-T-1	01/07/1983	1068.6
# 78-T-1	01/31/1983	1069.2
# 78-T-1	02/28/1983	1069.6
# 78-T-1	03/22/1983	1070.1
# 78-T-1	03/23/1983	1069.8
# 78-T-1	03/24/1983	1069.8
# 78-T-1	03/25/1983	1069.8
# 78-T-1	04/17/1983	1069.8
# 78-T-1	04/18/1983	1069.7
# 78-T-1	04/28/1983	1070.0
# 78-T-1	05/02/1983	1069.8
# 78-T-1	05/04/1983	1069.9
# 78-T-1	05/05/1983	1069.9
# 78-T-1	05/06/1983	1069.8
# 78-T-1	05/07/1983	1069.9
# 78-T-1	05/08/1983	1069.7
# 78-T-1	05/09/1983	1069.7
# 78-T-1	05/10/1983	1069.7
# 78-T-1	06/29/1983	1069.8
# 78-T-1	07/28/1983	1069.6
# 78-T-1	08/31/1983	1069.2
# 78-T-1	09/30/1983	1068.5
# 78-T-1	10/28/1983	1068.6

PNO	PDTRD	PREAD
# 78-T-2	01/01/1983	1062.8
# 78-T-2	01/02/1983	1062.8
# 78-T-2	01/03/1983	1062.8
# 78-T-2	01/04/1983	1062.7
# 78-T-2	01/05/1983	1062.5
# 78-T-2	01/06/1983	1062.4
# 78-T-2	01/07/1983	1062.9
# 78-T-2	01/31/1983	1062.9
# 78-T-2	02/28/1983	1062.8
# 78-T-2	03/22/1983	1062.9
# 78-T-2	03/23/1983	1062.7
# 78-T-2	03/24/1983	1062.7
# 78-T-2	03/25/1983	1062.7
# 78-T-2	04/17/1983	1062.9
# 78-T-2	04/18/1983	1062.4
# 78-T-2	04/28/1983	1063.2
# 78-T-2	05/02/1983	1063.0
# 78-T-2	05/04/1983	1063.1
# 78-T-2	05/05/1983	1062.9
# 78-T-2	05/06/1983	1062.9
# 78-T-2	05/07/1983	1062.9
# 78-T-2	05/08/1983	1062.9
# 78-T-2	05/09/1983	1062.8
# 78-T-2	05/10/1983	1062.8
# 78-T-2	06/29/1983	1062.4
# 78-T-2	07/28/1983	1062.3
# 78-T-2	08/31/1983	1061.9
# 78-T-2	09/30/1983	1061.5
# 78-T-2	10/28/1983	1061.8

PNO	PDTRD	PREAD
# POOL	01/01/1983	1128.6
# POOL	01/02/1983	1125.1
# POOL	01/03/1983	1121.8
# POOL	01/04/1983	1116.3
# POOL	01/05/1983	1112.7
# POOL	01/06/1983	1107.4
# POOL	01/07/1983	1103.0
# POOL	01/31/1983	1092.5
# POOL	02/28/1983	1092.1
# POOL	03/22/1983	1104.6
# POOL	03/23/1983	1105.4
# POOL	03/24/1983	1104.5
# POOL	03/25/1983	1102.2
# POOL	04/17/1983	1101.2
# POOL	04/18/1983	1101.6
# POOL	04/28/1983	1092.8
# POOL	05/02/1983	1104.6
# POOL	05/04/1983	1116.5
# POOL	05/05/1983	1119.9
# POOL	05/06/1983	1121.0
# POOL	05/07/1983	1117.7
# POOL	05/08/1983	1114.5
# POOL	05/09/1983	1110.9
# POOL	05/10/1983	1106.4
# POOL	05/24/1983	1104.2
# POOL	05/25/1983	1105.1
# POOL	05/26/1983	1102.9
# POOL	05/27/1983	1099.4
# POOL	07/28/1983	1092.5
# POOL	08/31/1983	1088.6
# POOL	09/30/1983	1088.1
# POOL	10/28/1983	1088.9

PNO	PDTRD	PREAD
# T.W.	01/01/1983	1049.3
# T.W.	01/02/1983	1049.2
# T.W.	01/03/1983	1049.2
# T.W.	01/04/1983	1049.1
# T.W.	01/05/1983	1049.1
# T.W.	01/06/1983	1048.9
# T.W.	01/07/1983	1048.8
# T.W.	01/31/1983	1048.7
# T.W.	02/28/1983	1048.7
# T.W.	03/22/1983	1047.9
# T.W.	03/23/1983	1048.4
# T.W.	03/24/1983	1048.4
# T.W.	03/25/1983	1048.4
# T.W.	04/17/1983	1046.6
# T.W.	04/18/1983	1048.8
# T.W.	04/28/1983	1046.3
# T.W.	05/02/1983	1046.6
# T.W.	05/04/1983	1046.7
# T.W.	05/05/1983	1047.6
# T.W.	05/06/1983	1048.2
# T.W.	05/07/1983	1049.1
# T.W.	05/08/1983	1049.1
# T.W.	05/09/1983	1049.0
# T.W.	05/10/1983	1049.1
# T.W.	06/24/1983	1047.9
# T.W.	06/25/1983	1049.1
# T.W.	06/26/1983	1049.0
# T.W.	06/27/1983	1048.9
# T.W.	07/28/1983	1046.2
# T.W.	08/31/1983	1044.3
# T.W.	09/30/1983	1044.0
# T.W.	10/28/1983	1044.8

PNO	PDTRD	PREAD
# PRECIP.	01/01/1983	0.0
# PRECIP.	01/02/1983	0.0
# PRECIP.	01/03/1983	0.0
# PRECIP.	01/04/1983	0.0
# PRECIP.	01/05/1983	0.0
# PRECIP.	01/06/1983	0.0
# PRECIP.	01/07/1983	0.0
# PRECIP.	01/31/1983	0.2
# PRECIP.	02/28/1983	0.0
# PRECIP.	03/22/1983	0.7
# PRECIP.	03/23/1983	0.0
# PRECIP.	03/24/1983	0.0
# PRECIP.	03/25/1983	0.0
# PRECIP.	04/17/1983	0.0
# PRECIP.	04/18/1983	0.1
# PRECIP.	04/28/1983	0.1
# PRECIP.	05/02/1983	0.0
# PRECIP.	05/04/1983	0.2
# PRECIP.	05/05/1983	0.0
# PRECIP.	05/06/1983	0.0
# PRECIP.	05/07/1983	0.0
# PRECIP.	05/08/1983	0.1
# PRECIP.	05/09/1983	0.2
# PRECIP.	05/10/1983	0.0
# PRECIP.	06/24/1983	0.1
# PRECIP.	06/25/1983	0.0
# PRECIP.	06/26/1983	0.2
# PRECIP.	06/27/1983	0.0
# PRECIP.	07/28/1983	1.2
# PRECIP.	08/31/1983	0.0
# PRECIP.	09/30/1983	0.1
# PRECIP.	10/28/1983	0.0

(Continued)

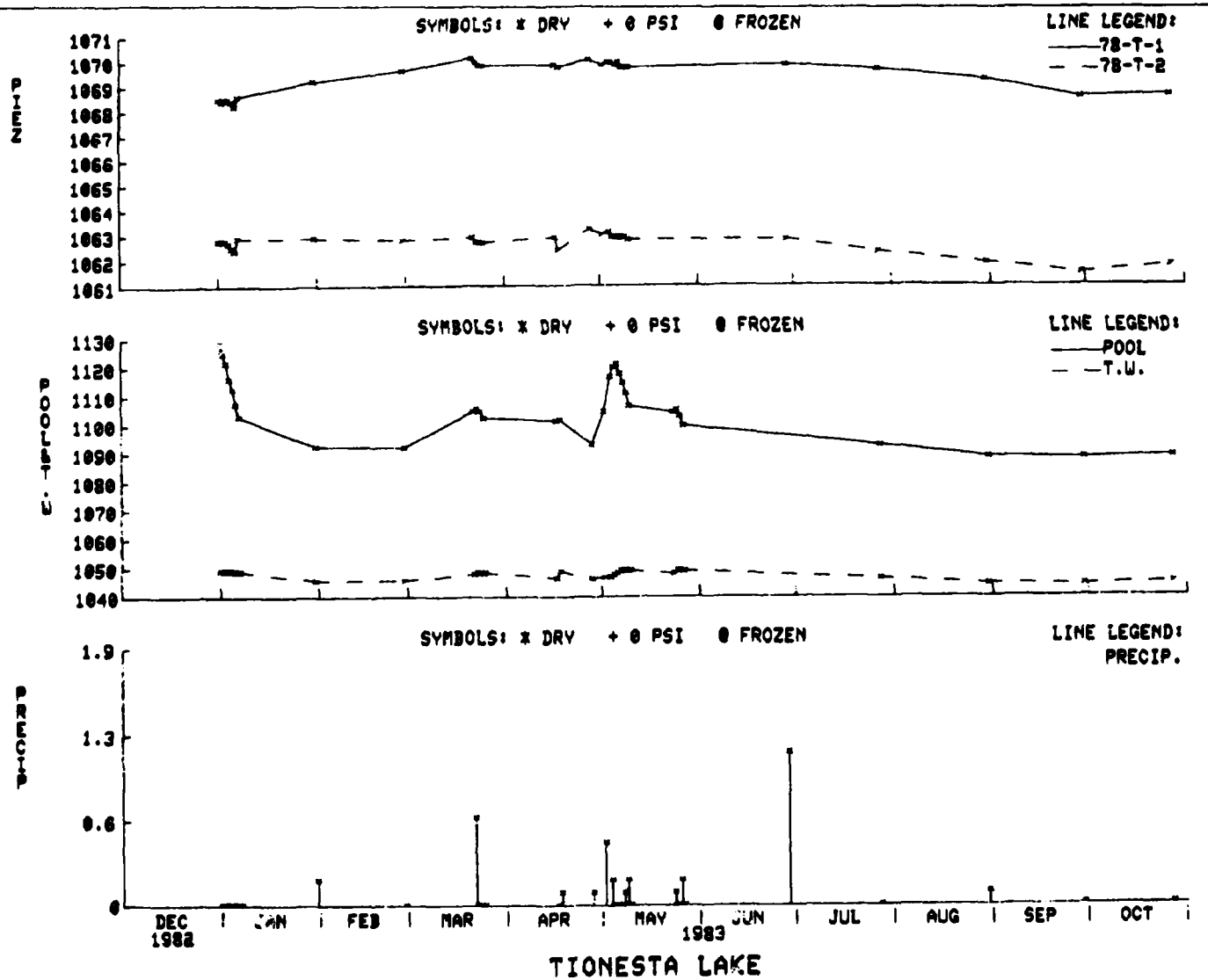
(Sheet 1 of 8)

Table 15 (Continued)

```
BEGIN,,PZ
 NUMBER OF SCALES ON THIS PAGE?(MAX. IS 3)
? 3
 HOW MANY CURVES ON THE FIRST SCALE?(MAX. IS 3)
? 2
 HOW MANY ON THE SECOND SCALE?(MAX. IS 3)
? 2
 HOW MANY ON THE THIRD SCALE?(MAX. IS 3)
? 1
 AUTOMATIC HARDCOPIES?(Y/N)
? Y
 NAME OF DATA FILE
? XYPZ
 TITLE OF PLOT?(25 CHAR. MAX)
? TIONESTA LAKE
 Y-LABEL FOR FIRST SCALE?(25 CHAR MAX.)
? PIEZ
 Y-LABEL FOR SECOND SCALE?(25 CHAR MAX.)
? POOL&T.W
 Y-LABEL FOR THIRD SCALE?(25 CHAR MAX.)
? PRECIP
```


(Continued)

Table 15 (Continued)



(Continued)

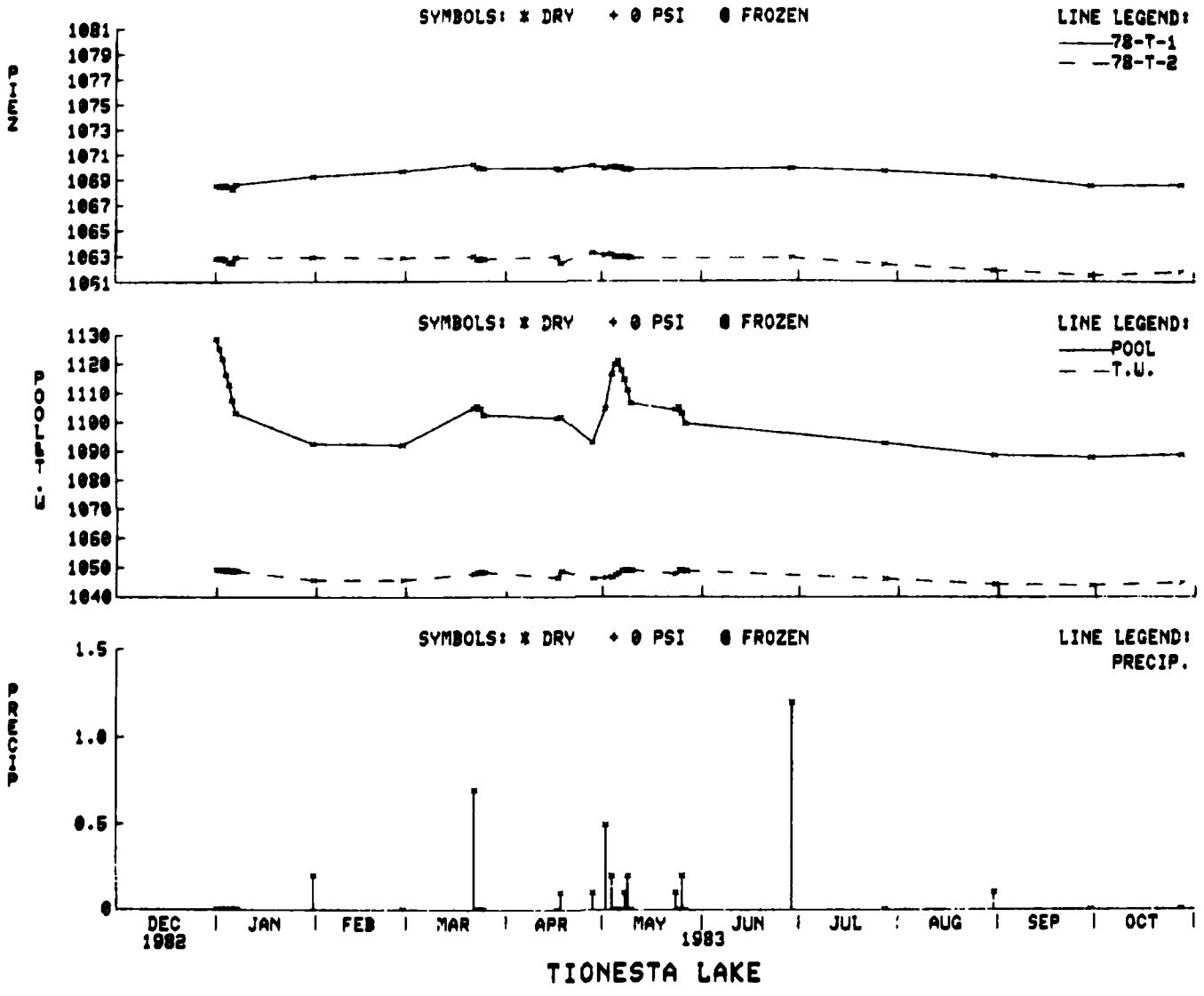
(Sheet 3 of 8)

Table 15 (Continued)

```
 DO YOU WANT A REPLOT AT DIFF Y SCALE ? (Y/N)
? Y
 FOR PLOT   1 ENTER MIN,MAX & INT
? 1061,1081,2
 FOR PLOT   2 ENTER MIN,MAX & INT
? 1040,1130,10
 FOR PLOT   3 ENTER MIN,MAX & INT
? 0,1.5,.5
```


(Continued)

Table 15 (Continued)



TIONESTA LAKE

(Continued)

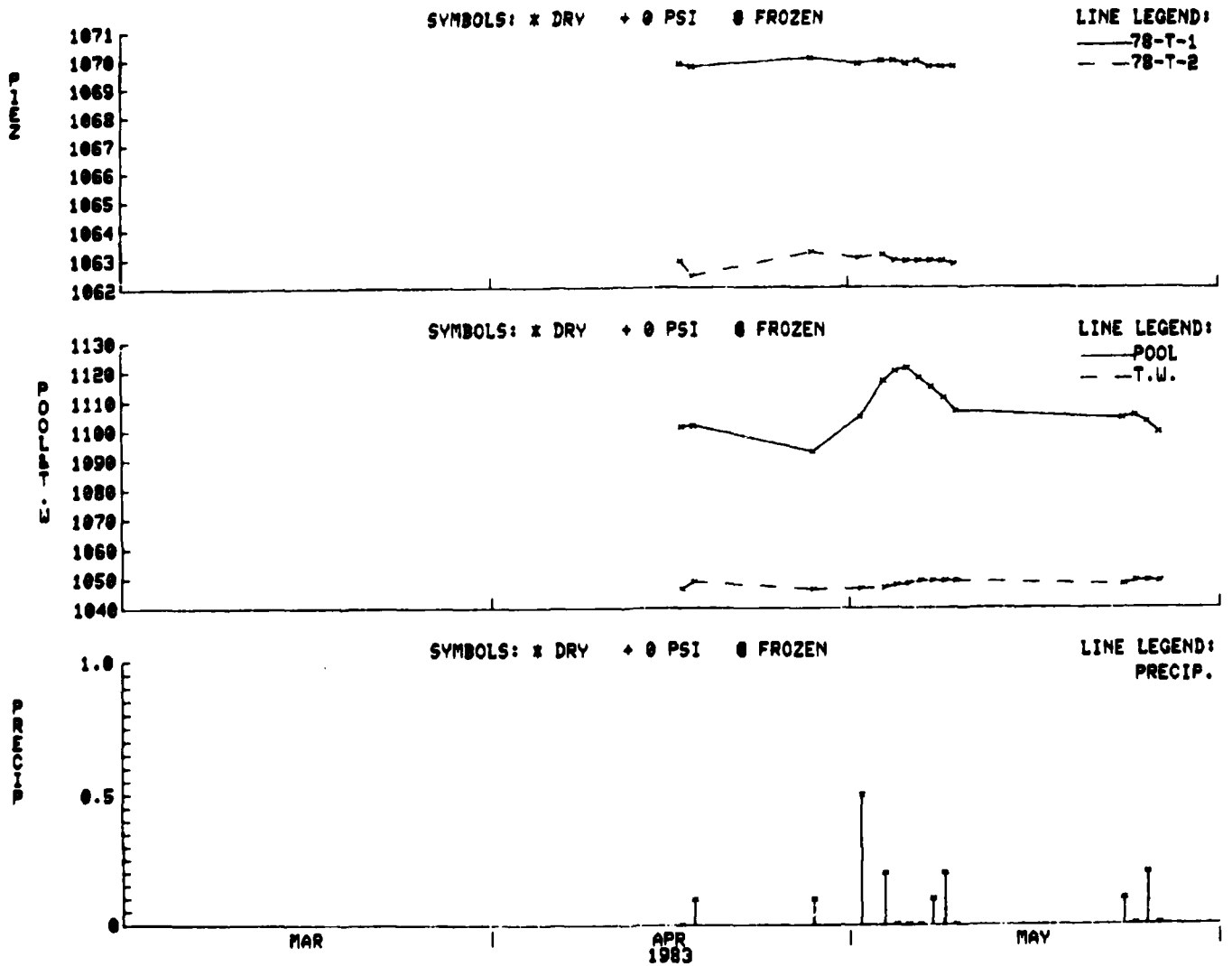
(Sheet 5 of 8)

Table 15 (Continued)

```
 DO YOU WANT A REPLOT AT DIFF Y SCALE ? (Y/N)
? N
 DO YOU WANT TO REPLOT A DIFF TIME SCALE? (Y/N)
? Y
 ENTER MIN. DATE FOR PLOT AS 01,01,1978
 FOR JAN. 1 1978
? 04,01,1983
 ENTER MAX. DATE FOR PLOT
? 06,01,1983
 TITLE OF PLOT?(25 CHAR. MAX)
? TIONESTA UINDOW OPTION
 Y-LABEL FOR FIRST SCALE?(25 CHAR MAX.)
? PIE2
 Y-LABEL FOR SECOND SCALE?(25 CHAR MAX.)
? POOL&T.W
 Y-LABEL FOR THIRD SCALE?(25 CHAR MAX.)
? PRECIP
```

(Continued)

Table 15 (Continued)



TIONESTA WINDOW OPTION

(Continued)

(Sheet 7 of 8)

Table 15 (Concluded)

```
 DO YOU WANT A REPLOT AT DIFF Y SCALE ? (Y/N)
? N
 DO YOU WANT TO REPLOT A DIFF TIME SCALE? (Y/N)
? N
 DO YOU WISH TO CONTINUE PLOTTING?(Y/N)
? N
$REVERT.CCL
/
```

```
?x1,y1 (Enter points from left x-value to right x-value)
?x2,y2
  ⋮
?x10,y10
?5 (Numbers of x & y coordinates in the second profile)
?x1,y1
  ⋮
?x5,y5
?END,,RL
/
```

The user is referred to paragraph 76 for limitations on entering the profile data, the maximum number of points, and the maximum range of x-axis values.

75. The data which is to be plotted must be retrieved from the data base and stored in a second file. Sign on the data base as described previously. The user must know which piezometers and the approximate dates to be plotted. Natural language retrievals are used to obtain or verify the data. An example of an interactive retrieval is the following command:

```
LIST C41,C45,C47,C91,C93 WH C1 EQ (project name)
AND (C45 SPANS (station for plot) OR C41 EQ POOL) AND
C91 SPANS (dates for plot);
```

This command would list all the data necessary for one cross-section plot. Instead of one command, it could be broken into two or more commands. Once the user knows what will be plotted, the following commands are used to establish a report file.

```
? REPORT FILE IS ZZZ;
? LIST C1 WH C1 EQ project name;
? LIST C41, C45, C47, C91, C93 WH C1 EQ project name AND
  C41 EQ piezometer number AND C91 SPAN$ dates for plot;
? EXIT;
  (Closes PIEZDB)
```

When the user exits the data base, all report files must be saved

```
/SAVE, ZZZ
```

76. Plot execution. Access to and execution of PZPRO are accomplished with the following command

```
/BEGIN,,PZPRO
```

77. Program prompts. The program prompts and the user responses are described below.

a. NAME OF DATA FILE. The user should enter the name of the report file which was created from the data base and saved as a permanent file.

b. ARE PROFILE POINTS IN A FILE? (Y or N) If specific points of the cross section have previously been saved in a file, enter a Y. The following prompt will appear:

FILE NAME?

The user should enter in the file name which contains the set of profile points. If the data file does not exist, an appropriate message will appear and the user will be prompted for the correct file name. The program will read points from the file and proceed to the date in prompt g. If the profile points must be entered during this session, enter a N. The user will be asked for the data in prompts c. through f.

c. HOW MANY PROFILES ARE IN THIS CROSS SECTION? Enter the number of profiles or strata changes with the cross section.

d. HOW MANY PROFILE POINTS ARE THERE? Enter the number of profile points. One profile point consists of an X and Y value. A total of 100 profile points is allowed for all the strata of one cross section.

e. WHAT ARE PROFILE POINTS? (L to R; X, Y format) The user should enter profile points from the far left X value to the far right X value. The format should be X comma Y with no point having over six digits including one decimal place. The first points must be less than the second, and the range of the offset, or X axis, cannot exceed 2,000 ft.

f. DO YOU WANT TO SAVE PROFILE POINTS IN A FILE? (Y or N) If the user would like to save the points for later use, enter a Y. The user will then be prompted for the file name.

ENTER FILE NAME TO SAVE PROFILE DATA.

Enter any seven characters for the file to store the profile points. If a file already exists with the same name, an appropriate message will appear, and the user will be reprompted. With a reply of N, the program continues and checks the offset range. If the range is greater than 2,000 ft, the program will issue an appropriate warning.

OFFSET RANGE TOO LARGE

and then revert back to prompt d. asking for a new set of profile points. When a piezometer data file and profile

data have been entered correctly, a list of piezometer numbers with corresponding dates from the data file will be listed on the screen. The next prompts allow the user to select the reading dates to be plotted.

g. HOW MANY DATES DO YOU WANT TO PLOT? (Max is 3) The user should enter 1, 2, or 3 depending on the desired number of dates to be plotted. The maximum is three reading dates.

h. WHAT DATES WOULD YOU LIKE PLOTTED? (MM/DD/YYYY) (PUT IN THE # OF DATES YOU HAVE ALREADY SPECIFIED) Choose the dates from the list on the screen. Enter only the number of dates specified in the previous prompt. The date format is MM/DD/YYYY. When plotting is finished, a bell will sound twice. The user should make a hard copy at this time. The screen will be erased upon entering a carriage return.

i. WOULD YOU LIKE TO PLOT MORE DATES FROM THIS FILE? (Y or N) The user can plot more dates from the same data file. A reply of Y will return to the prompt f. Entering N causes the program to continue.

j. DO YOU WANT TO PLOT FROM A DIFFERENT DATA FILE? (Y or N) The answer to this prompt allows the user to generate plots of different cross sections or to terminate the program.

78. Example. Table 16 shows an example of profile and data file generation and use of the PZPRO program.

Boring Location Plots

79. Capabilities. The boring location plot program, BORMAP, asks for the data file name and allows the user to review the data file and select the data group desired for plotting. The user is then queried for plotting options. The options include data columns to plot, type of coordinates, plot title, scales, grid display, and symbol numbers with corresponding piezometer numbers. Station and offset coordinates can be automatically converted to latitude and longitude by entering the values for the first listed piezometer. A polyconic projection can also be obtained. Station and offset coordinates can also be used. The values are automatically converted to decimal numbers with offsets converted to plus and minus numbers. Piezometer location plots can be displayed at the graphics terminal and also directed to a drum plotter to produce a plot to a desired scale for use as an overlay on an existing map. The program is available on CDC and the WES Honeywell computer system.

80. Data files. This data file for use with BORMAP must be generated with the LIST command. The file should contain at least the piezometer numbers and the station and offset coordinates. The WHERE clause in the LIST command should specify the desired project and piezometers. The data components in the

Table 16

Example of PZPRO

```
-GETDB
 + SEE README FOR CHANGES TO PROCEDURE "S2KGET"

 + README LAST MODIFIED 09-15-84.

 ++ CORPS S2K VERSION 2.8 ++

 85/03/25. 14.40.24. BEGIN SYSTEM 2000  RELEASE M2.80D
 ---
? USER.[redacted]:DBN IS PIEZDB;
 -256-   ASSIGNED   PIEZDB
 ---
? REPORT FILE IS PR01;
 ---
? LI C1 WH C1 EQ TIONESTA LAKE;
 ---
? LI C41,C45,C47,C49,C51,C91,C93 WH C41 EQ 78-T-9
 ---
?  AND C91 SPANS 06/01/1982*06/30/1982;
 ---
? DITTO WH C41 EQ 78-T-12 AND C91 SPANS 06/01/1982*06/30/1982;
 ---
? DITTO WH C41 EQ 78-T-13 AND C91 SPANS 06/01/1982*06/30/1982;
 ---
? DITTO WH C41 EQ 78-T-14 AND C91 SPANS 06/01/1982*06/30/1982;
 ---
?
EXIT;
 -506-   CLOSED     PIEZDB                    1    67 85/01/16.
 85/03/25. 14.45.34. END   SYSTEM 2000  RELEASE M2.80D
STOP S2K
-SAVE.PR01
```

User does not need to specify the project name if the piezometer number is unique.

(Continued)

(Sheet 1 of 11)

Table 16 (Continued)

```
OLD,POINTS
/LIST
3
21
-3,1002
-5,1007
-10,1007
-85,1056
-425,1056
-12,1197
12,1197
80,1170
90,1170
164,1145
174,1145
248,1120
258,1120
336,1094
356,1094
495,1056
85,1056
10,1007
5,1007
3,1002
-3,1002
13
-3,1002
-5,1007
-10,1007
-85,1056
-121,1056
-6,1197
6,1197
121,1056
85,1056
10,1007
5,1007
3,1002
-3,1002
10
-425,1012
-10,1012
-10,1007
-5,1007
-3,1002
3,1002
5,1007
10,1007
10,1012
495,1012
/
```

There are three zones in this profile with 21 x & y coordinates in the first zone, 13 in the second and 10 in the third zone.

(Continued)

(Sheet 2 of 11)

Table 16 (Continued)

```
OLD,PR01
/LIST
   PROJ-NAME
 ***
 * TIOMESTA LAKE
   PNO          PSTA      POFF          TIPEL        TREL          PDTRD        PREAD
 ***
 * 78-T-8       6+25      40SD/S        1015.5       1064.2     06/09/1982      1051.7
 * 78-T-8       6+25      40SD/S        1015.5       1064.2     06/18/1982      1051.7
 * 78-T-8       6+25      40SD/S        1015.5       1064.2     06/19/1982      1051.9
 * 78-T-8       6+25      40SD/S        1015.5       1064.2     06/20/1982      1051.9
 * 78-T-8       6+25      40SD/S        1015.5       1064.2     06/21/1982      1052.5
   PNO          PSTA      POFF          TIPEL        TREL          PDTRD        PREAD
 ***
 * 78-T-12      6+25      12D/S         1031.8       1199.2     06/09/1982      1079.5
 * 78-T-12      6+25      12D/S         1031.8       1199.2     06/18/1982      1079.5
 * 78-T-12      6+25      12D/S         1031.8       1199.2     06/19/1982      1079.5
 * 78-T-12      6+25      12D/S         1031.8       1199.2     06/20/1982      1079.5
 * 78-T-12      6+25      12D/S         1031.8       1199.2     06/21/1982      1079.6
   PNO          PSTA      POFF          TIPEL        TREL          PDTRD        PREAD
 ***
 * 78-T-13      6+25      80D/S         1069.4       1182.2     06/09/1982      1075.3
 * 78-T-13      6+25      80D/S         1069.4       1182.2     06/18/1982      1075.5
 * 78-T-13      6+25      80D/S         1069.4       1182.2     06/19/1982      1075.7
 * 78-T-13      6+25      80D/S         1069.4       1182.2     06/20/1982      1075.8
 * 78-T-13      6+25      80D/S         1069.4       1182.2     06/21/1982      1075.4
   PNO          PSTA      POFF          TIPEL        TREL          PDTRD        PREAD
 ***
 * 78-T-14      6+25      164D/S        1066.6       1147.6     06/09/1982      1067.9
 * 78-T-14      6+25      164D/S        1066.6       1147.6     06/18/1982      1067.8
 * 78-T-14      6+25      164D/S        1066.6       1147.6     06/19/1982      1067.8
 * 78-T-14      6+25      164D/S        1066.6       1147.6     06/20/1982      1067.8
 * 78-T-14      6+25      164D/S        1066.6       1147.6     06/21/1982      1067.8
/
```

(Continued)

Table 16 (Continued)

```
BEGIN,,PZPRO
 NAME OF DATA FILE?
? PRO1
 ARE PROFILES IN A DATA FILE?
? Y
 WHAT IS THE NAME OF THE FILE FOR THE PROFILES?
? POINTS
78-T-8          06/09/1982
78-T-8          06/18/1982
78-T-8          06/19/1982
78-T-8          06/20/1982
78-T-12         06/09/1982
78-T-12         06/18/1982
78-T-12         06/19/1982
78-T-12         06/20/1982
78-T-13         06/09/1982
78-T-13         06/18/1982
78-T-13         06/19/1982
78-T-13         06/20/1982
78-T-14         06/09/1982
78-T-14         06/18/1982
78-T-14         06/19/1982
78-T-14         06/20/1982
78-T-14         06/21/1982
 HOW MANY DATES DO YOU WANT TO PLOT?(MAX. IS 3)
? 3
 WHAT DATES WOULD YOU LIKE PLOTTED?(MM/DD/YYYY)
 (PUT IN THE # OF DATES YOU HAVE ALREADY SPECIFIED)
 COPY DATA NOW IF NEEDED FOR LATER USE
? 06/09/1982
? 06/18/1982
? 06/20/1982
```

At this point the program will commence to plot the profile after a carriage return.

The user may also create the profile points interactively.

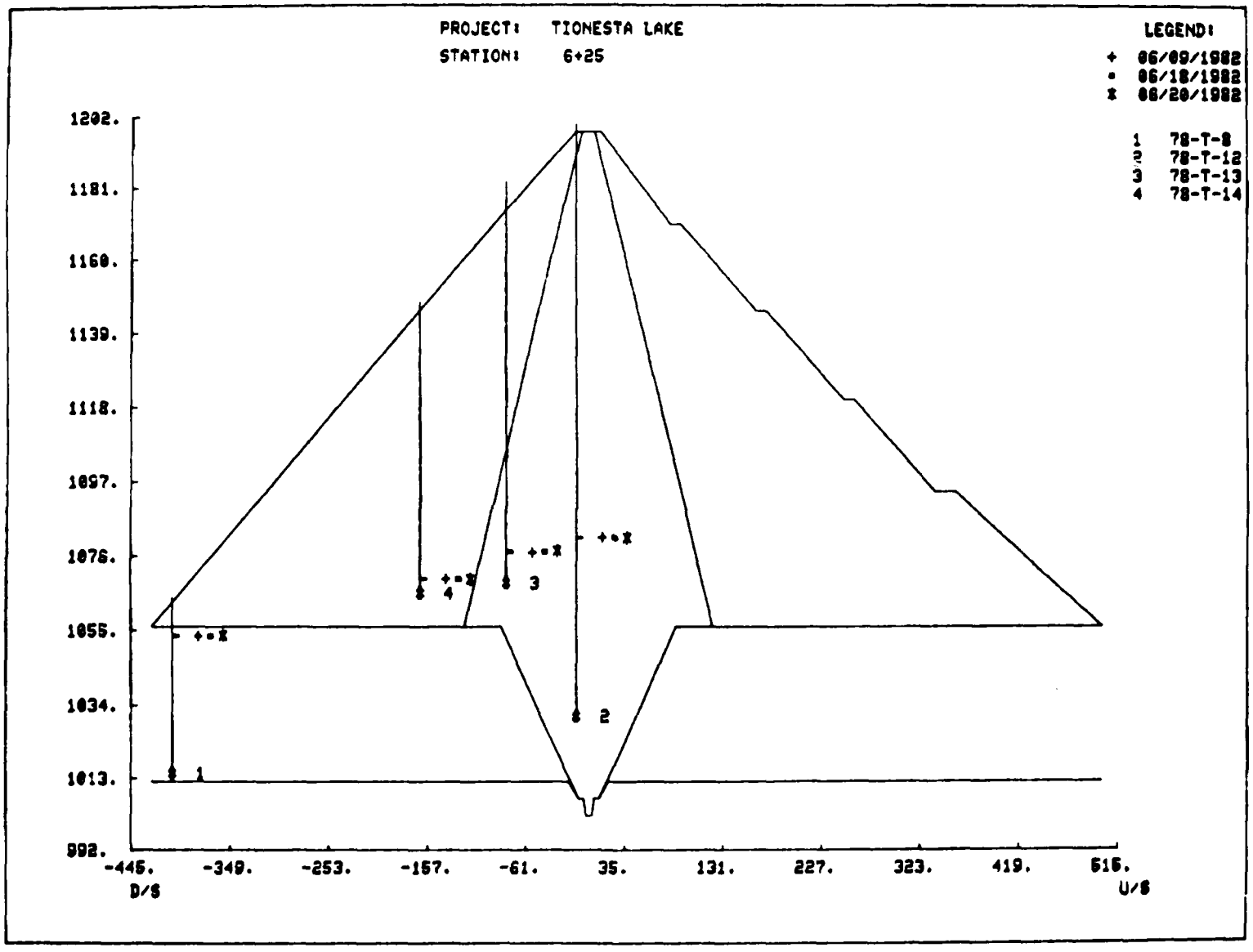
```
BEGIN,,PZPRO
 NAME OF DATA FILE?
? PRO1
 ARE PROFILES IN A DATA FILE?
? N
 HOW MANY PROFILES ARE IN THIS CROSS-SECTION?
? 3
 HOW MANY PROFILE POINTS ARE THERE?(X,Y=1 PT.)
? 21
 WHAT ARE PROFILE POINTS?(L TO R;X1,Y1 FORMAT)
? -3,1002
? -5,1007
? -10,1007
? -85,1056
? -12,1197
? 12,1197
? 80,1180
?
```

After 21 profile points have been entered the program will then ask the user for the next set of points for the second zone and then the third.

(Continued)

(Sheet 4 of 11)

Table 16 (Continued)



(Continued)

(Sheet 5 of 11)

Table 16 (Continued)

```
 WOULD YOU LIKE TO PLOT MORE DATES IN THIS FILE?(Y OR N)
? N
 DO YOU WANT TO PLOT FROM A DIFFERENT DATA FILE?(Y OR N)
? N
$REVERT.CCL
/
```

(Continued)

(Sheet 6 of 11)

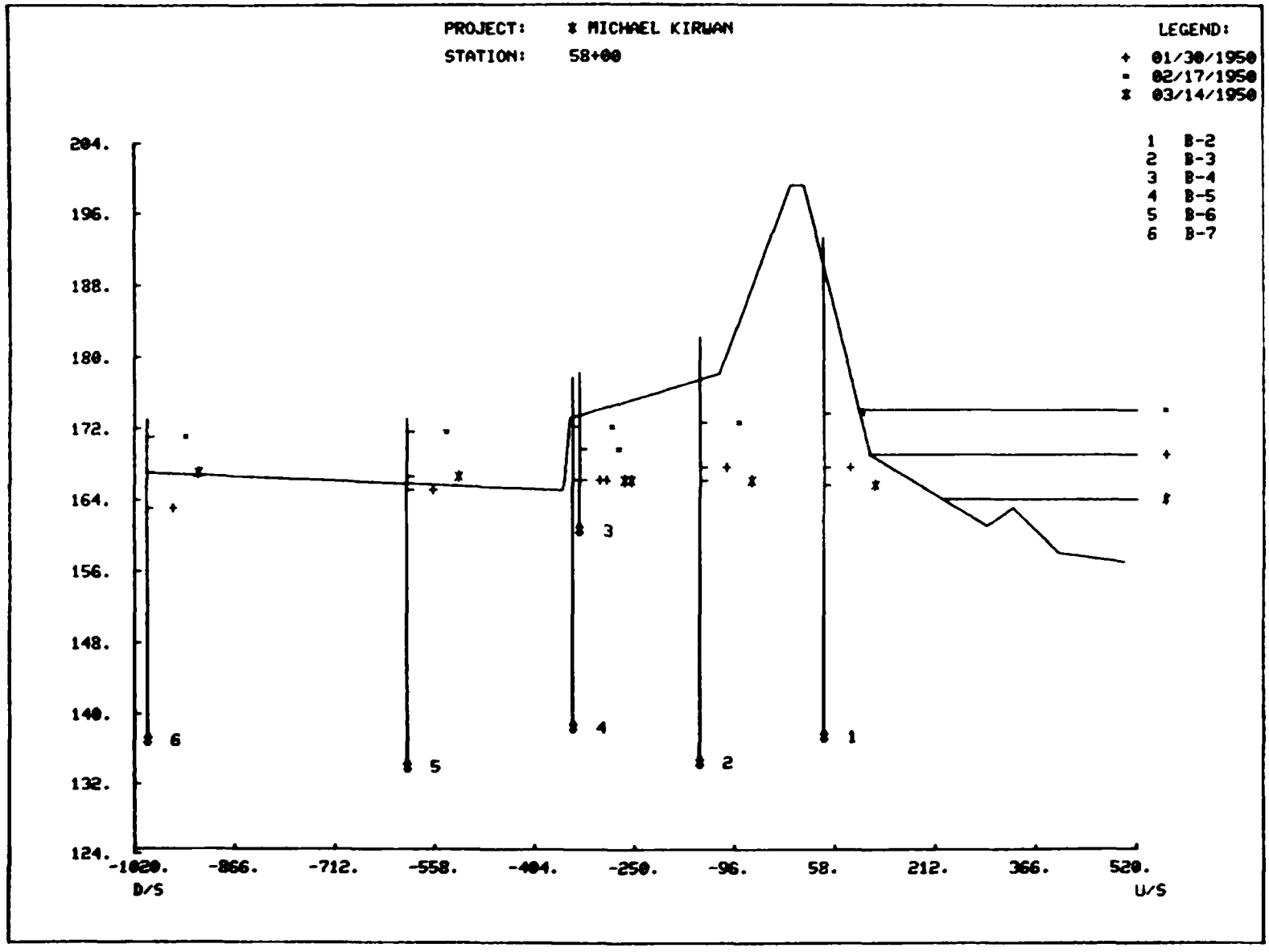
Table 16 (Continued)

```
BEGIN, PZPRO
 NAME OF DATA FILE?
? PRO2
 ARE PROFILES IN A DATA FILE?
? N
 HOW MANY PROFILES ARE IN THIS CROSS-SECTION?
? 1
 HOW MANY PROFILE POINTS ARE THERE?(X,Y=1 PT.)
? 11
 WHAT ARE PROFILE POINTS?(L TO R;X1,Y1 FORMAT)
? -1000,167
? -360,165
? -350,173
? -120,178
? -10,199
? 10,199
? 110,169
? 290,161
? 330,163
? 400,159
? 500,157
 DO YOU WANT TO SAVE PROFILE POINTS?(Y/N)
? Y
 ENTER FILE NAME
? POINT2
  B-1           02/17/1950
  B-1           01/30/1950
  B-1           03/14/1950
  B-2           02/17/1950
  B-2           01/30/1950
  B-2           03/14/1950
  B-3           02/17/1950
  B-3           01/30/1950
  B-3           03/14/1950
  B-4           02/17/1950
  B-4           01/30/1950
  B-4           03/14/1950
  B-5           02/17/1950
  B-5           01/30/1950
  B-5           03/14/1950
  B-6           02/17/1950
  B-6           01/30/1950
  B-6           03/14/1950
  B-7           02/17/1950
  B-7           01/30/1950
  B-7           03/14/1950
  POOL          02/17/1950
  POOL          01/30/1950
  POOL          03/14/1950
   HOW MANY DATES DO YOU WANT TO PLOT?(MAX. IS 3)
  ? 3
   WHAT DATES WOULD YOU LIKE PLOTTED?(MM/DD/YYYY)
   (PUT IN THE 8 OF DATES YOU HAVE ALREADY SPECIFIED)
   COPY DATA NOW IF NEEDED FOR LATER USE
  ? 01/30/1950
  ? 02/17/1950
  ? 03/14/1950
```

(Continued)

(Sheet 7 of 11)

Table 16 (Continued)



(Continued)

(Sheet 8 of 11)

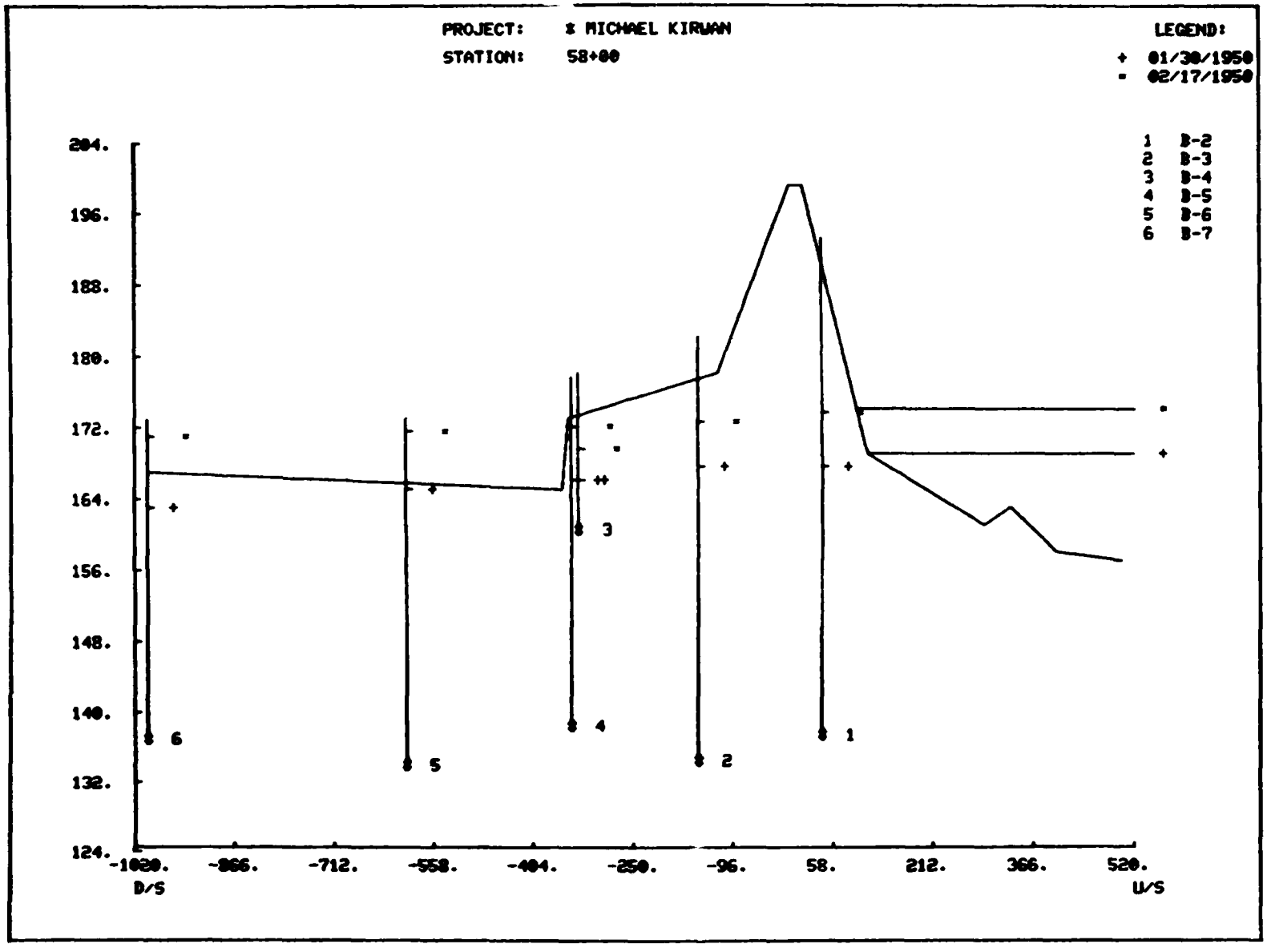
Table 16 (Continued)

```
 WOULD YOU LIKE TO PLOT MORE DATES IN THIS FILE?(Y OR N)
? Y
 HOW MANY DATES DO YOU WANT TO PLOT?(MAX. IS 3)
? 2
 WHAT DATES WOULD YOU LIKE PLOTTED?(MM/DD/YYYY)
 (PUT IN THE 8 OF DATES YOU HAVE ALREADY SPECIFIED)
 COPY DATA NOW IF NEEDED FOR LATER USE
? 02/30/1950
? 02/17/1950
```

(Continued)

(Sheet 9 of 11)

Table 16 (Continued)



(Continued)

(Sheet 10 of 11)

Table 16 (Concluded)

```
 WOULD YOU LIKE TO PLOT MORE DATES IN THIS FILE?(Y OR N)
? N
 DO YOU WANT TO PLOT FROM A DIFFERENT DATA FILE?(Y OR N)
? N
$REVERT.CCL
/
```

(Sheet 11 of 11)

LIST command can be in any order, since the program displays the headings for the user to select. If it is desired to have piezometer numbers listed in numerical order with the symbol numbers at the side of the plot, the ORDERED BY clause should be used for C41 when creating the data file. Data files that already exist with the desired data in the desired order can also be used.

81. Plot execution. Access to and execution of BORMAP are accomplished with the following command:

```
/BEGIN,,BORMAP
```

At the beginning of the program, two choices are given for selection of 80- or 132-character width screen by a GCS routine (choices 0 and K). Always choose 0, since K causes the program to stop with error messages. Next, enter the data file name when asked, and answer the prompts described after the next paragraph.

82. Scales. The BORMAP program uses map scales (e.g., 1:10,000) and displays the limiting scales of the data to be plotted to stay within the graphics screen limits. To produce a true scale drawing on the graphics terminal hard copy machine, entered scales are multiplied by five and the resulting scales are shown at the top of the plot. For example, if the limiting scales for the data were 1:1,000 and 1:2,000 and scales of 1:2,000 were selected for both coordinate sets, then the resulting plot would have scales of 1:10,000. Thus, to obtain an engineer scale of 1 in. = 1,000 ft (1 in = 12,000 in.) for this example, scales of 1:2,400 should be selected to produce a hard copy with scales of 1:12,000. Plots directed to drum plotter are drawn to the user specified scales. In the above example the drum plot would be drawn accurately to a scale of 1:2,400 (even though the preview plot on the screen would be drawn to the scale of 1:12,000).

83. Program prompts. The program prompts and their results are described below.

a. DATA FILE NAME? (ENTER 04 TO KEEP CURRENT FILE). The user should enter the file name for the first plot and can then enter 04 for other plots with the same data later in the session.

b. DO YOU WANT TO LIST 04? Entering Y produces the listing, and N causes the program to skip to the next prompt.

c. PLOT TITLE? The plot title is entered (50-character maximum) and will appear across the top of the plot.

d. BORING DESCRIPTORS TO BE PRINTED ON PLOT. If the response is Y, the plotted points will be numbered (1, 2, 3, etc.), and a table of these numbers and corresponding piezometer numbers will be included on the right side of the plot. If N is entered, the numbers and the table will not be shown on the plot.

e. SCALING OPTIONS, ENTER 0-AUTO 1-SET MANUALLY 2-USE LAST SCALE. Entering 0 results in automatic grid scaling for the limits of the data. Entering 1 allows user to select his own grid scale limits (minimum of 500 ft for offset and 1,000 ft for station grid spacing). Entering 2 specifies that the grid scale used for the previous plot in the current session be used for the next plot.

f. DO YOU WANT THE GRID DRAWN? (Y/N OR H IF YOU WANT THE GRID TIC LINES BUT NOT LABELS). Entering Y produces a complete grid with coordinate labels and N suppresses the grid and labels. Entering H produces tic lines around the border and at grid intersections but does not label the coordinates.

g. CHOOSE VERT SCALE =1: XXXX
CHOOSE HORZ SCALE =1: XXXX

The maximum scale values for the data to fit on the screen are shown, and the user enters desired values equal to or greater than those shown (e.g., 2,400, 2,400 for equal vertical and horizontal scales to produce an engineering scale of 1 in. = 1,000 ft, i.e. 5 x 2,400 = 1:12,000). If 1 is entered in prompt e., prompt g. above is replaced with a display of the maximum and minimum values of the x and y coordinates, and the user is asked to enter the desired values (e.g., 622,500, 625,500, 1,601,000, 1,605,000).

h. ARE THE GRAPHICS TO GO TO THE DRUM PLOTTER? Y/N/M--(M FOR MAYBE-GIVES PREVIEW ON SCREEN). After entering the desired option, the following message appears:

MAKE COPY AND/OR HIT RETURN

At this point the user can copy the screen before hitting the return key. On CDC the user should enter a number (e.g., 3) before hitting the return key (otherwise the program may stop with a series of error messages). Entering Y skips the screen plot and starts drum plots queries. A reply of N produces a plot on the screen and skips the drum plot option. Entering M produces a plot with options to send it to the drum plotter after review or to start a new plot. After every plot is finished, the terminal beeps to allow the user to copy the plot before hitting the return key. In the M option, after the plot is copied and return is entered, the user is asked "TO DRUM NOW?" If the reply is N, new plot queries are started. If the reply is Y on CDC, the user is asked for his user number. When the user number is entered, the screen should be copied before hitting the return key

because the system responds that TAPE999 is the plot tape file, and the screen is quickly erased. (The user has to contact his ADP center to pull his plot file for CDC and plot it.) On the Honeywell system, the user is asked for his identification and other data to define the remote site and type of plot. After entering the type of plot options, the screen should be copied, since a snub number is displayed and the screen is immediately erased. It may be necessary for the user to contact his ADP center to pull his plot file from the Division Honeywell system.

84. Examples. Table 17 shows examples of data file generation and use of the BORMAP program.

Contouring

85. Capabilities. The contouring program, BORCON, for piezometer data can produce a contour plot of any elevation data. The program is the same as that for BORMAP with contouring added. The contouring option was adapted from a program developed by Mr. Fred Tracy, WESKS. The user is asked for the data file name and is asked questions about the options for columns to plot, type of coordinates, scale, grid display, and point reference number or symbol display. Additional prompts ask if contouring is desired, what column combinations and factor (col 5 +/- col 4 times a factor) are to be used for plotting, and what boundary elevation code to use for the border of the plot to prevent unrealistic contours at the limits of the data. A piezometer location plot is drawn first, and then contours are added. The program does not provide for blocking out of interior areas where contours are not wanted. For example, if piezometer contours were drawn for an area with a high, impervious ridge of rock through the middle of an area, contours for water table elevations would also be drawn through the ridge. One way to overcome this problem might be to outline the ridge with additional data points of the same elevation that is higher than any adjacent point outside the ridge. Contour plots can be displayed at the graphics terminal (Tektronix or equivalent), or directed to a flat bed plotter to produce a plot to a desired scale for use as an overlay on an existing map. The program is presently only available on the Honeywell computer systems. Selection and use of scales are the same as for the BORMAP program.

86. Data files. The data file for use with BORCON must be generated with the LIST command. The file is generated in the same manner as for the BORMAP program. The file should contain the elevation data needed for contouring.

Table 17

Example of BORMAP

```
-SETDB

   ++ CORPS S2K VERSION 2.8 ++

   85/07/05. 11.01.22. BEGIN SYSTEM 2000  RELEASE M2.80D

---
? USER,INFORMATION TO PIEZDB;
 -556-   ASSIGNED    PIEZDB                    1       1 84/07/26. 11.32.28.
---
? REPORT FILE TO MKPZEL;
---
? LIST C41,C13,C47,C87 WH C1 EQ MICHAEL KIRMAN;
---
? REPORT FILE TO OUTPUT;
---
? EXIT;
 -506-   CLOSED      PIEZDB                    1       1 84/07/26. 11.32.28.
 84/07/26  11.58.54. END   SYSTEM 2000  VERSION 2.60F
STOP S2K
/SAVE,MKPZEL
```

(Continued)

(Sheet 1 of 5)

Table 17 (Continued)

OLD MKPZELU
LIST

PNO	PSTA	POFF	PREAD
###			
# 11-AC	46+48	275'DS	945.2
# 16-AC	52+46	164'DS	959.8
# 18-AC	52+50	336'DS	958.3
# 21-AC	59+00	175'DS	960.0
# 26-AC	65+00	15'US	966.5
# 29-AC	46+14	600'DS	941.2
# 37-AC	43+50	275'DS	946.0
# 38-AC	48+50	275'DS	952.2
# 44-AC	39+50	450'DS	951.4
# 48-AUP	60+75	516'DS	958.8
# 50-AUP	54+75	516'DS	944.1
# 51-AUP	56+75	516'DS	947.6
# 52-AUP	58+75	516'DS	951.4
# 57-AUP	37+75	450'DS	969.9
# 58-AUP	35+75	450'DS	955.0
# 59-AUP	33+25	420'DS	957.8
# 60-AUP	31+75	430'DS	965.3
# 63-AC	41+75	11.5'DS	968.2
# 70-C-1	46+00	15'US	970.6
# 70-C-2	46+00	120'DS	932.0
# 70-C-4	46+00	220'DS	932.0
# 70-C-6	46+00	320'DS	932.6
# 80-MK-10	42+50	170'DS	950.5
# 80-MK-11	42+50	330'DS	947.0
# 80-MK-12	43+00	12'US	972.7
# 80-MK-15	49+02	12'DS	955.4
# 80-MK-16	49+00	120'DS	933.8
# 80-MK-18	51+50	125'DS	934.1
# 80-MK-19	51+50	220'DS	933.5
# 80-MK-20	51+50	320'DS	933.5
# 80-MK-22	55+03	13'DS	956.5
# 80-MK-7	37+00	12'US	970.3
# 80-MK-8	42+48	12'DS	968.1
# 9-AC	48+50	15'US	931.2

(Continued)

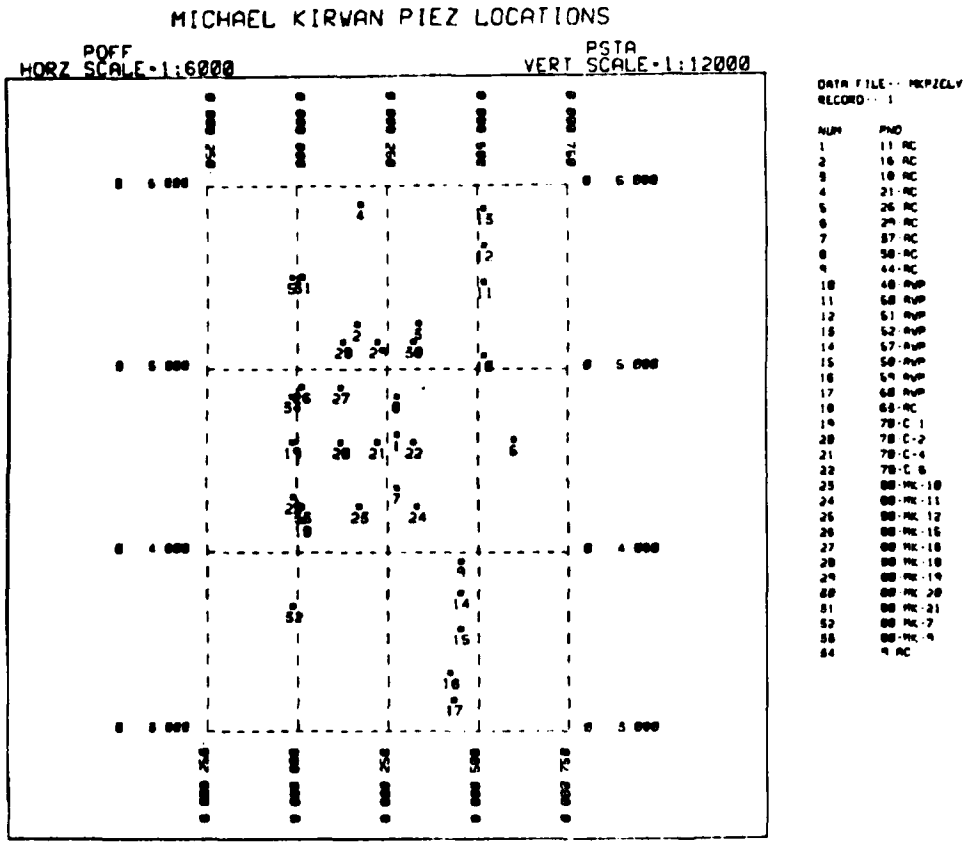
Table 17 (Continued)

```
BORMAP
A RESPONSE OF R TO ANY Y/N QUESTION WILL
REDIRECT CONTROL TO THE QUERY 'DATAFILE NAME'

DATAFILE NAME ?
*MKPZELV
RECORD $ & $ LINES TO BE PRINTED ?
  (ENTER 0,0 TO CHANGE DATAFILE)
*1,3
  PNO          PSTA       POFF          PREAD
###
# 11-AC        46+40      275'DS        945.2

-------------------------------------------------------------------
PNO          PSTA       POFF          PREAD
1            2          3             4

-------------------------------------------------------------------
IS THIS THE RECORD YOU WANT (Y OR N) ?
*Y
ENTER X-COL$ & Y-COL$ (OR LAT$ & LONG$)
*2,3
WHICH COL IS THE DESCRIPTOR ?
ZERO RESPONSE MEANS DESCRIPTOR WILL
BE CREATED AS 1,2,3,....N
*1
  34 DATA LINES WRITTEN ON @4
DO YOU WANT TO LIST @4 ? (Y/N)
*N
A RESPONSE OF R TO ANY Y/N QUESTION WILL
REDIRECT CONTROL TO THE QUERY 'TITLE'

PLOT TITLE ? (TYPE QUIT TO GET DATAFILE QUERY)
*MICHAEL KIRWAN PIEZ LOCATIONS
BORING DESCRIPTORS TO BE PRINTED ON PLOT ? (Y/N)
*Y
SCALING OPTIONS. ENTER 0-AUTO
  1-SET MANUALLY  2-USE LAST SCALE
*0
DO YOU WANT THE GRID DRAWN ? (Y/N OR H IF
 YOU WANT THE GRID TICLINES BUT NO LABELS)
*Y
CHOOSE VERT SCALE >*1:     1500
CHOOSE HORZ SCALE >*1:      500
*2400,1200
ARE THE GRAPHICS TO GO TO THE DRUM PLOTTER ?
 Y/N/H--(H for maybe-gives preview on screen)
*H
MAKE COPY AND/OR HIT RETURN
*
```

(Continued)

(Sheet 3 of 5)

Table 17 (Continued)



DATA FILE -- MKPIEZLV
RECORD -- 1

NUM	PNO
1	11 RC
2	16 RC
3	19 RC
4	21 RC
5	26 RC
6	33 RC
7	37 RC
8	38 RC
9	44 RC
10	46 RC
11	48 RC
12	51 RC
13	52 RC
14	57 RC
15	58 RC
16	59 RC
17	66 RC
18	68 RC
19	70 C-1
20	70 C-2
21	70 C-4
22	70 C-6
23	88 PK-10
24	88 PK-11
25	88 PK-12
26	88 PK-15
27	88 PK-16
28	88 PK-18
29	88 PK-19
80	88 PK-20
81	88 PK-21
82	88 PK-7
83	88 PK-9
84	4 RC

(Continued)

(Sheet 4 of 5)

Table 17 (Concluded)

```
TO DRUM NOW ?(Y/N)
•Y
ENTER IDENT CARD INFORMATION
FOR UES: USERID,NAME
•R@QRCAC,GL-STROHM
INPUT STATION CODE FOR OUTPUT (00 IF NOT REMOTE)
•00
INPUT PRIORITY (5 OR 40)
•5
WANT DEFAULT SETTINGS (YES-OR-NO)
(PLAIN PAPER, PEN 1-BLACK BALL POINT,
 PEN 2-RED BALL POINT, PEN 3-GREEN BALL POINT,
 PEN 4-BLUE BALL POINT, REGULAR PEN SIZE)
•Y
PLOT TAPE DESCRIPTION (12 CHARACTERS MAX)

CHAR 1 - S
CHAR 2 - C
CHAR 3 - PAPER (P-PLAIN, G-GRID, S-SPECIAL)
CHAR 4 - PEN 1 TYPE (B-BALL POINT, L-LIQUID INK)
CHAR 5 - PEN 1 COLOR (R-RED,G-GREEN,B-BLACK,U-BLUE)
CHAR 6 - PEN 2 TYPE (B-BALL POINT, L-LIQUID INK)
CHAR 7 - PEN 2 COLOR (R-RED,G-GREEN,B-BLACK,U-BLUE)
CHAR 8 - PEN 3 TYPE (B-BALL POINT, L-LIQUID INK)
CHAR 9 - PEN 3 COLOR (R-RED,G-GREEN,B-BLACK,U-BLUE)
CHAR 10 - PEN 4 TYPE (B-BALL POINT, L-LIQUID INK)
CHAR 11 - PEN 4 COLOR (R-RED,G-GREEN,B-BLACK,U-BLUE)
CHAR 12 - LIQUID INK PEN SIZE (R-REGULAR,F-FINE,X-EXTRA
                                                FINE

EXAMPLE - TYPING IN THE FOLLOWING YIELDS A PLOT TAPE WITH
          PLAIN PAPER AND PEN 1 BEING BLACK LIQUID INK

 $CPLB

ENTER DESCRIPTION
•$CPLU
$NUMB 6265A
```

BORCON allows the use of a contour values derived from any column plus or minus any other column times a factor. Data files already generated that include desired data can be used, since the program displays the data groups and columns for selection of data by the user.

87. Examples. Table 18 shows an example of contouring plots on the Honeywell computer system.

General X-Y Plot

88. Capabilities. This plot program was developed to plot data in an x-y format. Any data file that contains columns of values can be plotted with this program. To generate a plot, the user selects options from the menu listed below:

OPTION	DESCRIPTION
1	NAME INPUT DATA FILE
2	READ LABELS FROM FILE
3	INPUT LABELS FROM THE TERMINAL
4	STANDARD SCALE
5	INPUT SCALE FROM THE TERMINAL
6	LINE ADDED TO PLOT
7	PLOT DATA
8	TERMINATE PROGRAM (STOP)

Options 1 and 7 must be selected to generate a plot along with either option 4 or 5. If titles and labels are required, then options 2 or 3 must be selected. The options can be selected one by one or several at a time. In addition to selecting the data file name, the first option determines which data will be plotted. This option will print the data file line by line until the user indicates that the first line of the x-axis data has been encountered. At this point, the user is asked for the column number at the beginning of the data along with the size of the data. The user then indicates how many curves will be plotted along the x-axis. The y-axis data, which could be located in a different data file than the x-axis, is then located by the same method that for the x-axis data. By using this method, data that are located in various columns can be selected (i.e., plot data in column 6 versus column 2). The last question this option asks the user is whether the data points should be connected with a line. Both the second and third options will read three

Table 18

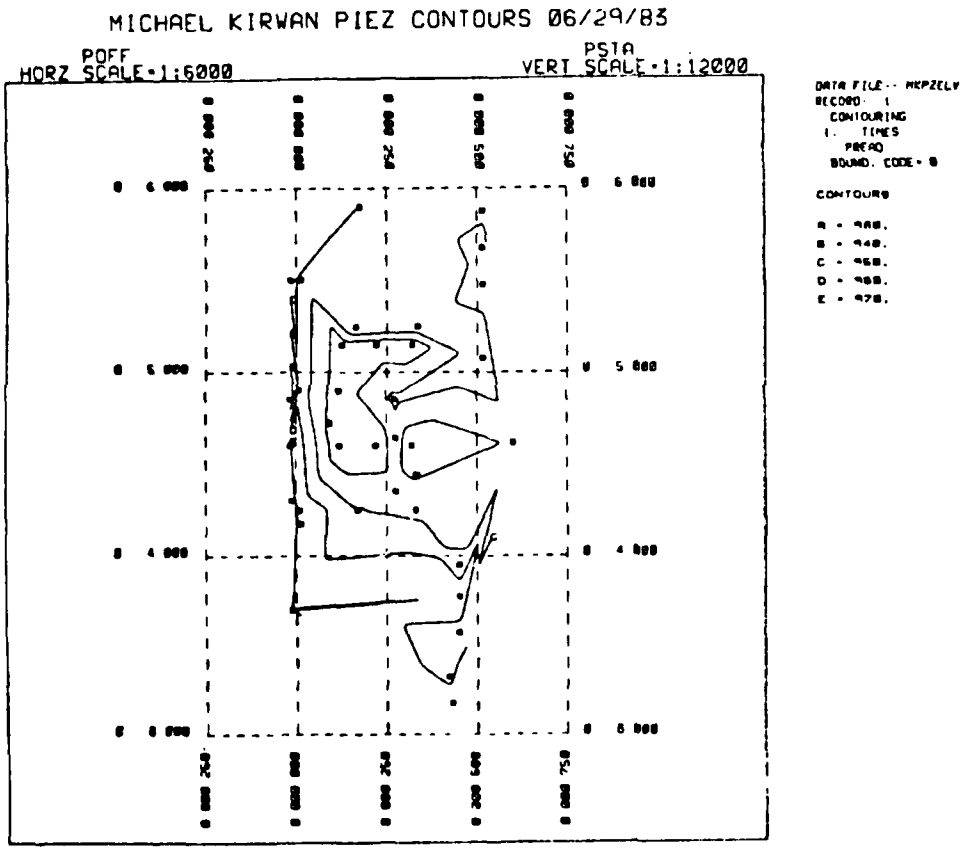
Example of BORCON

```
FORT OLD BORCON
%RUN
SOURCE LINE  18370
(W)1470 EQUALITY OR NON-EQUALITY COMPARISON MAY NOT BE MEANINGFUL I
N LOGICAL IF EXPRESSIONS
SOURCE LINE  22010
(W)1470 EQUALITY OR NON-EQUALITY COMPARISON MAY NOT BE MEANINGFUL I
N LOGICAL IF EXPRESSIONS
SOURCE LINE  46570
(W)1470 EQUALITY OR NON-EQUALITY COMPARISON MAY NOT BE MEANINGFUL I
N LOGICAL IF EXPRESSIONS
SOURCE LINE  52310
(W)1470 EQUALITY OR NON-EQUALITY COMPARISON MAY NOT BE MEANINGFUL I
N LOGICAL IF EXPRESSIONS
A RESPONSE OF R TO ANY Y/N QUESTION WILL
REDIRECT CONTROL TO THE QUERY 'DATAFILE NAME'

DATAFILE NAME ?
*MKPZELU
RECORD # & # LINES TO BE PRINTED ?
  (ENTER 0,0 TO CHANGE DATAFILE)
*1,2
  PNO          PSTA       POFF          PREAD
###

-------------------------------------------------------------------
PNO          PSTA         POFF         PREAD
1            2            3            4
-------------------------------------------------------------------
IS THIS THE RECORD YOU WANT (Y OR N) ?
*Y
ENTER X-COL# & Y-COL# (OR LAT# & LONG#)
*3,2
DO YOU WANT TO CONTOUR SOMETHING CONTAINED IN THIS RECORD ? (Y/N)
*Y
YOU MAY CONTOUR THE RESULT OF
ANY COL +/- ANOTHER COL TIMES A FACTOR

TO SPECIFY, ENTER 3 NUMBERS. I.E., TO CONTOUR
COL#5-COL#3 TIMES 12, ENTER 5,-3,12. TO
CONTOUR ONLY COL#5, ENTER 5,0,1
*4,0,1
WHICH COL IS THE DESCRIPTOR ?
ZERO RESPONSE MEANS DESCRIPTOR WILL
BE CREATED AS 1,2,3,....N
*1
  34 DATA LINES WRITTEN ON 04
DO YOU WANT TO LIST 04 ? (Y/N)
*N
A RESPONSE OF R TO ANY Y/N QUESTION WILL
REDIRECT CONTROL TO THE QUERY 'TITLE'

PLOT TITLE ? (TYPE QUIT TO GET DATAFILE QUERY)
*MICHAEL KIRWAN PIEZ CONTOURS 06/29/83
BORING DESCRIPTORS TO BE PRINTED ON PLOT ? (Y/N)
*N
SCALING OPTIONS. ENTER 0-AUTO
   1-SET MANUALLY  2-USE LAST SCALE
*0
DO YOU WANT THE GRID DRAWN ? (Y/N OR H IF
 YOU WANT THE GRID TICLINES BUT NO LABELS)
*Y
DO YOU STILL/NOW WANT TO INCLUDE CONTOURING ? (Y/N)
```

(Continued)

(Sheet 1 of 3)

Table 18 (Continued)



(Continued)

(Sheet 2 of 3)

Table 18 (Concluded)

```
TO DRUM NOW ? (Y/N)
•Y
ENTER IDENT CARD INFORMATION
FOR UES: USERID,NAME
•R0GRCAC,GL-STROHM
INPUT STATION CODE FOR OUTPUT (00 IF NOT REMOTE)
•00
INPUT PRIORITY (5 OR 40)
•5
WANT DEFAULT SETTINGS (YES-OR-NO)
(PLAIN PAPER, PEN 1-BLACK BALL POINT,
 PEN 2-RED BALL POINT, PEN 3-GREEN BALL POINT,
 PEN 4-BLUE BALL POINT, REGULAR PEN SIZE)
•Y
PLOT TAPE DESCRIPTION (12 CHARACTERS MAX)

CHAR 1 - X
CHAR 2 - C
CHAR 3 - PAPER (P-PLAIN, G-GRID, S-SPECIAL)
CHAR 4 - PEN 1 TYPE (B-BALL POINT, L-LIQUID INK)
CHAR 5 - PEN 1 COLOR (R-RED,G-GREEN,B-BLACK,U-BLUE)
CHAR 6 - PEN 2 TYPE (B-BALL POINT, L-LIQUID INK)
CHAR 7 - PEN 2 COLOR (R-RED,G-GREEN,B-BLACK,U-BLUE)
CHAR 8 - PEN 3 TYPE (B-BALL POINT, L-LIQUID INK)
CHAR 9 - PEN 3 COLOR (R-RED,G-GREEN,B-BLACK,U-BLUE)
CHAR 10 - PEN 4 TYPE (B-BALL POINT, L-LIQUID INK)
CHAR 11 - PEN 4 COLOR (R-RED,G-GREEN,B-BLACK,U-BLUE)
CHAR 12 - LIQUID INK PEN SIZE (R-REGULAR,F-FINE,X-EXTRA
                                                FINE

EXAMPLE - TYPING IN THE FOLLOWING YIELDS A PLOT TAPE WITH
          PLAIN PAPER AND PEN 1 BEING BLACK LIQUID INK

 $CPLB

ENTER DESCRIPTION
•$CPLU
$NUMB 6204A
```

(Sheet 3 of 3)

lines of data up to 23 characters each for the title and x and y axis labels. The second option will read from a user-specified data file, while the third option will prompt the user for the information. The standard scale, option 4, will use the minimum data value to establish the lower end of the scale and then increment the scale by an interval which is determined from the range of the data. If the user does not like the standard scale, option 5 can be used to set the scale. This option can be used to window in on a portion of the data. Option 6 allows up to four lines to be added to the plot (i.e., 45 deg line, or vertical and horizontal specification boundaries). The last two options are self-explanatory. Once the data have been defined, the user can go through the options in any order. Thus, an initial plot with the standard scale could be generated; then the user could modify the scale, add lines, and replot.

89. The data files for use with this plot program can contain any number of data columns and heading information. These files will usually be generated in the data base by using the REPORT FILE and LIST commands. The only data restriction for this plot program is that only numeric values can be plotted.

90. Plot execution. The following command will execute the x-y plot program.

```
BEGIN,,GENXY
```

91. Example. Table 19 shows an example of the use of the x-y plot program. This example illustrates the use of one data file to generate a plot and the use of two separate data files to generate the same plot.

Table 19

Generalized X-Y Plot

```
OLD,XYDATA
/LIST
        DATE          POOL      PIEZ
  ***
  * 02/28/1974       1946.6    1880.7
  * 06/25/1974       1947.6    1880.9
  * 09/28/1976       1932.3    1881.2
  * 08/11/1978       1937.3    1881.1
  * 07/02/1979       1940.6    1881.0
  * 04/10/1980       1945.0    1880.2
  * 06/18/1981       1940.5    1877.7
  * 04/01/1982       1944.0    1881.4
  * 10/14/1982       1943.2    1882.2
  * 03/18/1983       1947.4    1878.4
  * 09/16/1983       1939.4    1876.4
  * 03/30/1984       1944.2    1880.5
  * 09/17/1984       1937.3    1881.9
  * 04/01/1985       1942.1    1833.8
/OLD,XDATA
/LIST
        DATE          POOL
  ***
  * 02/28/1974       1946.6
  * 06/25/1974       1947.6
  * 09/28/1976       1932.3
  * 08/11/1978       1937.3
  * 07/02/1979       1940.6
  * 04/10/1980       1945.0
  * 06/18/1981       1940.5
  * 04/01/1982       1944.0
  * 10/14/1982       1943.2
  * 03/18/1983       1947.4
  * 09/16/1983       1939.4
  * 03/30/1984       1944.2
  * 09/17/1984       1937.3
  * 04/01/1985       1942.1
/OLD,YDATA
/LIST
        DATE          PIEZ
  ***
  * 02/28/1974       1880.7
  * 06/25/1974       1880.9
  * 09/28/1976       1881.2
  * 08/11/1978       1881.1
  * 07/02/1979       1881.0
  * 04/10/1980       1880.2
  * 06/18/1981       1877.7
  * 04/01/1982       1881.4
  * 10/14/1982       1882.2
  * 03/18/1983       1878.4
  * 09/16/1983       1876.4
  * 03/30/1984       1880.5
  * 09/17/1984       1881.9
  * 04/01/1985       1833.8
/
```

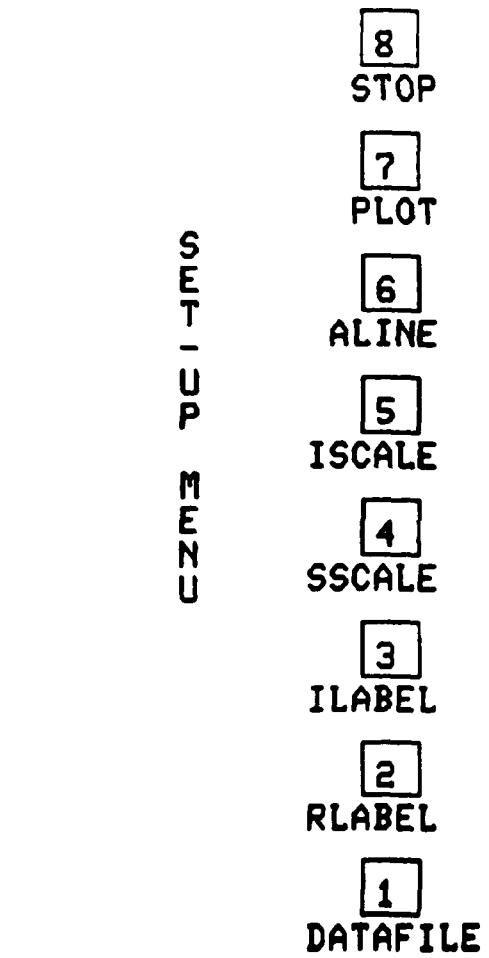
(Continued)

Table 19 (Continued)

```
BEGIN,,GENXY
 DEVICE-
?
 LEGAL DEVICE CODES ARE:
 ALP - ALPHANUMERIC TERMINALS (80 COLS)
 C93 - CALCOMP 935 PLOTTER
 PTR - LINE PRINTER (120 COLS)
 RJE - REMOTE PLOTTING
 TEK - TEKTRONIX 4010/4013 TERMINALS
 TK4 - TEKTRONIX 4014/4015 TERMINALS
 T27 - TEKTRONIX 4027 TERMINAL
 T62 - TEKTRONIX 4014/4015 TERMINALS & TEKTRONIX 4662
 T63 - TEKTRONIX 4014/4015 TERMINALS & TEKTRONIX 4663
 T41 - TEKTRONIX 4114 TERMINAL
 DR4 - TEKTRONIX 4014/4015 TERMINALS & CALCOMP PLOTTER
 DEVICE-
? TK4
```

(Continued) (Sheet 2 of 20)

Table 19 (Continued)



MULTIPLE OPTIONS ARE SELECTED
TO EXIT, MOVE THE CROSSHAIRS ABOVE BOX 8
AND ENTER A CARRIAGE RETURN ONLY

Options 1,3,4,and 7 were selected for this example .

(Continued)

Table 19 (Continued)

```
 NAME OF DATA FILE
? XYDATA
        DATE          POOL      PIEZ

   ***


 IS THIS THE BEGINNING OF YOUR DATA (Y/N)
? N
   * 02/28/1974      1946.6    1880.7


 IS THIS THE BEGINNING OF YOUR DATA (Y/N)
? Y

            1         2         3         4         5
  123456789012345678901234567890123456789012345678901234567890
   * 02/28/1974      1946.6    1880.7


 INPUT STARTING COLUMN FOR X
? 28

 NUMBER OF CHARACTERS IN X FIELD
? 6

 NUMBER OF CURVES PER PLOT
? 1
     CURVE 1
 IS THIS DATA IN SAME DATA FILE (Y/N)
? Y
```

(Continued)

Table 19 (Continued)

```
 INPUT STARTING COLUMN FOR Y
? 19

 NUMBER OF CHARACTERS IN Y FIELD
? 6

 DO YOU WANT A LINE TO CONNECT DATA POINTS (Y/N)
? N
```

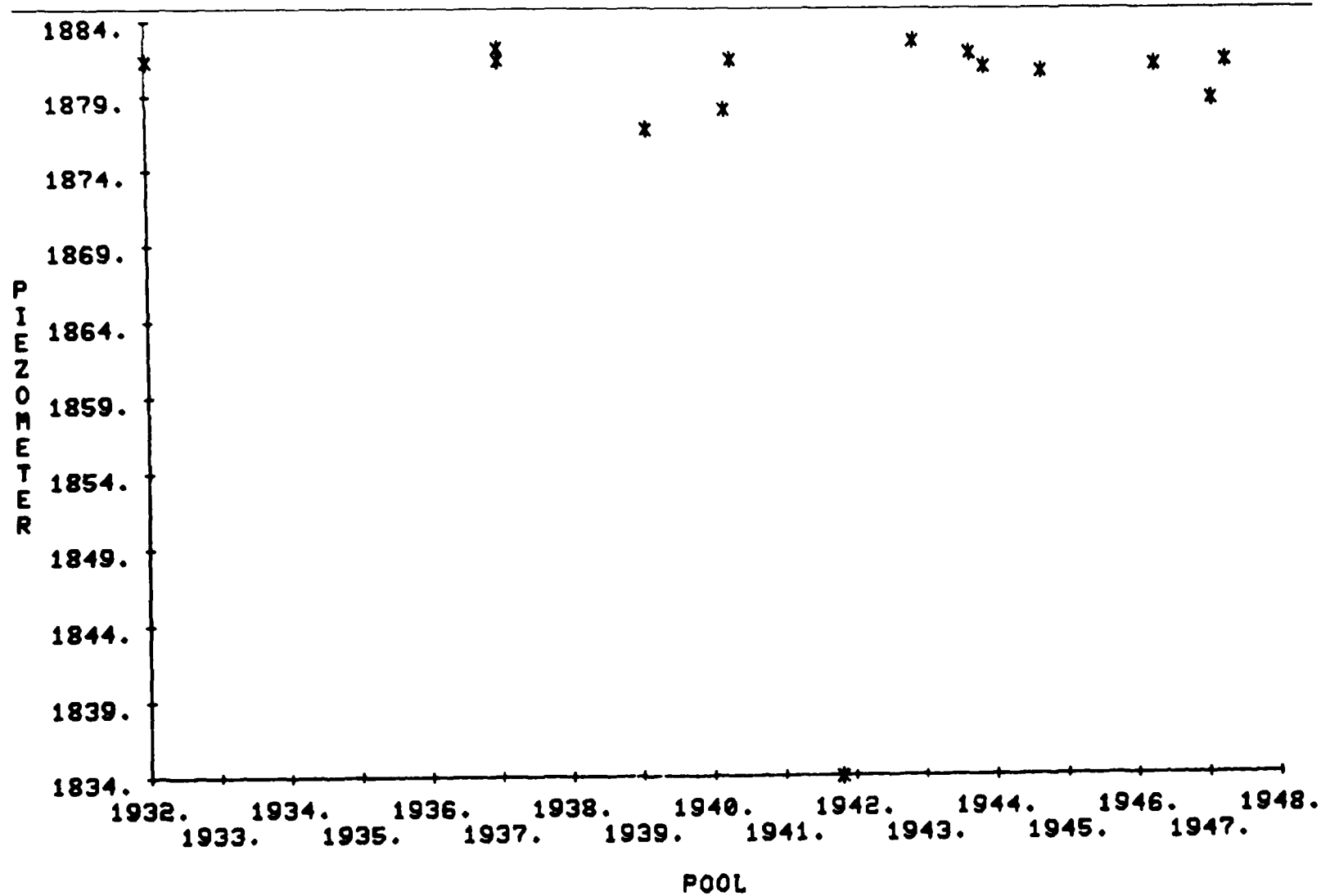

(Continued)

Table 19 (Continued)

```
 INPUT TITLE (23 CHARACTERS MAX)
? GENERALIZED XY PLOT

 INPUT X-AXIS LABEL (23 CHARACTERS MAX.)
? POOL

 INPUT Y-AXIS LABEL (23 CHARACTERS MAX.)
? PIEZOMETER
```


(Continued)

Table 19 (Continued)



GENERALIZED XY PLOT

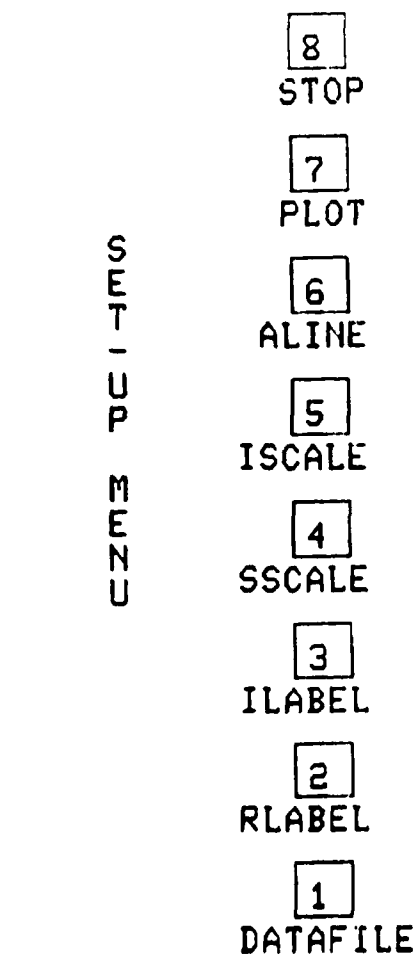
(Continued)

(Sheet 7 of 20)

Table 19 (Continued)

```
 WOULD YOU LIKE TO SELECT SEVERAL OPTIONS AT
 ONE TIME  (Y/N)
? Y
```


(Continued)



MULTIPLE OPTIONS ARE SELECTED
TO EXIT, MOVE THE CROSSHAIRS ABOVE BOX 8
AND ENTER A CARRIAGE RETURN ONLY

Options 5 and 7, user select scale.

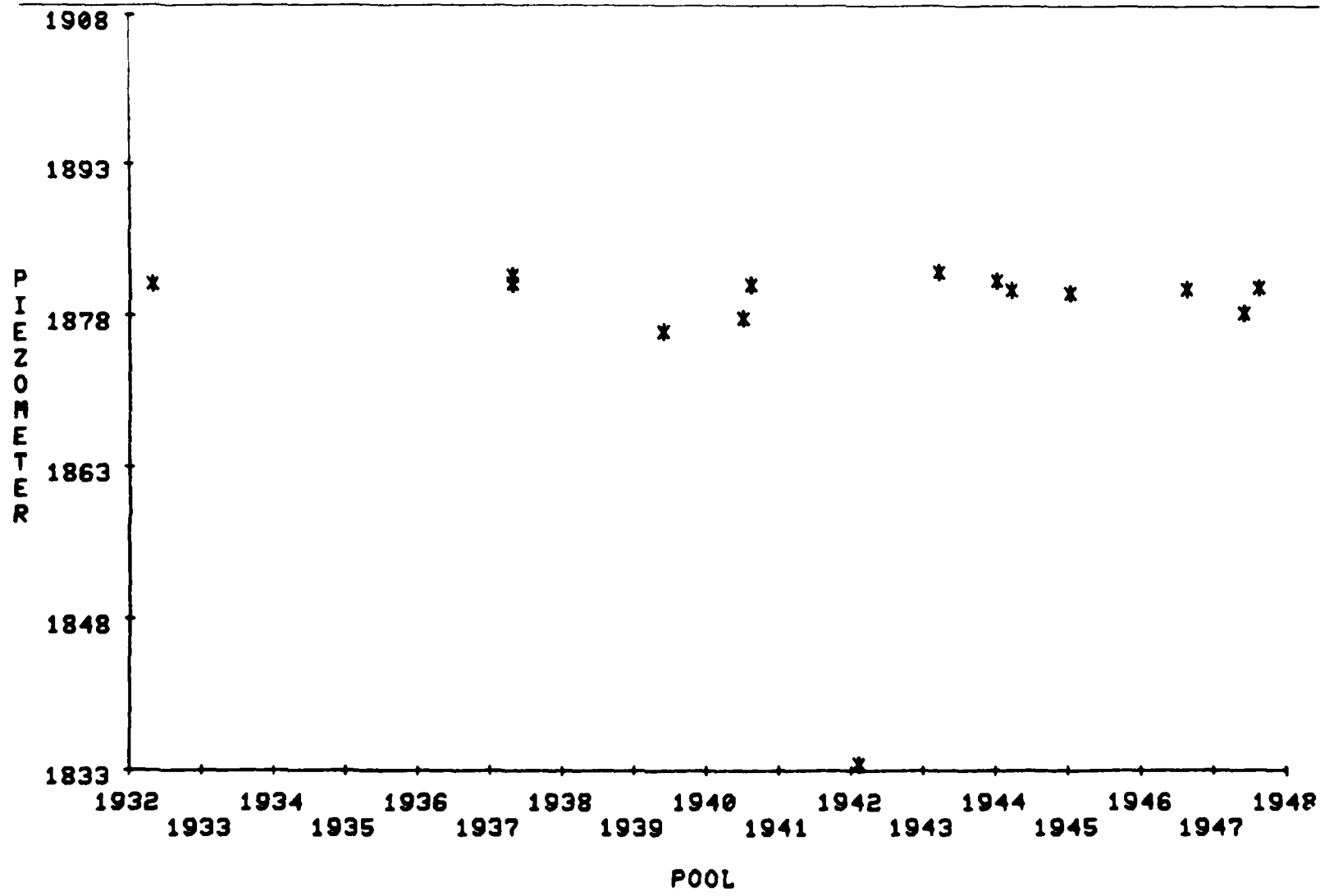
(Continued) (Sheet 9 of 20)

Table 19 (Continued)

```
  INPUT XMIN,XMAX FOR BOUNDARY
? 1932,1948
  INPUT X INCREMENT
? 1
  INPUT YMIN,YMAX FOR BOUNDARY
? 1833,1894
  INPUT Y INCREMENT
? 15
```

(Continued)

Table 19 (Continued)



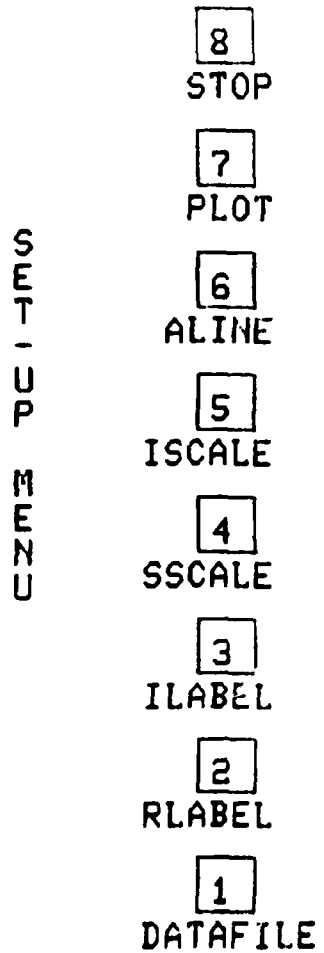
(Continued)

(Sheet 11 of 20)

Table 19 (Continued)

```
 WOULD YOU LIKE TO SELECT SEVERAL OPTIONS AT
 ONE TIME  (Y/N)
? Y
```


(Continued) (Sheet 12 of 20)



MULTIPLE OPTIONS ARE SELECTED
TO EXIT, MOVE THE CROSSHAIRS ABOVE BOX 8
AND ENTER A CARRIAGE RETURN ONLY

Options 6 and 7, to add a line.

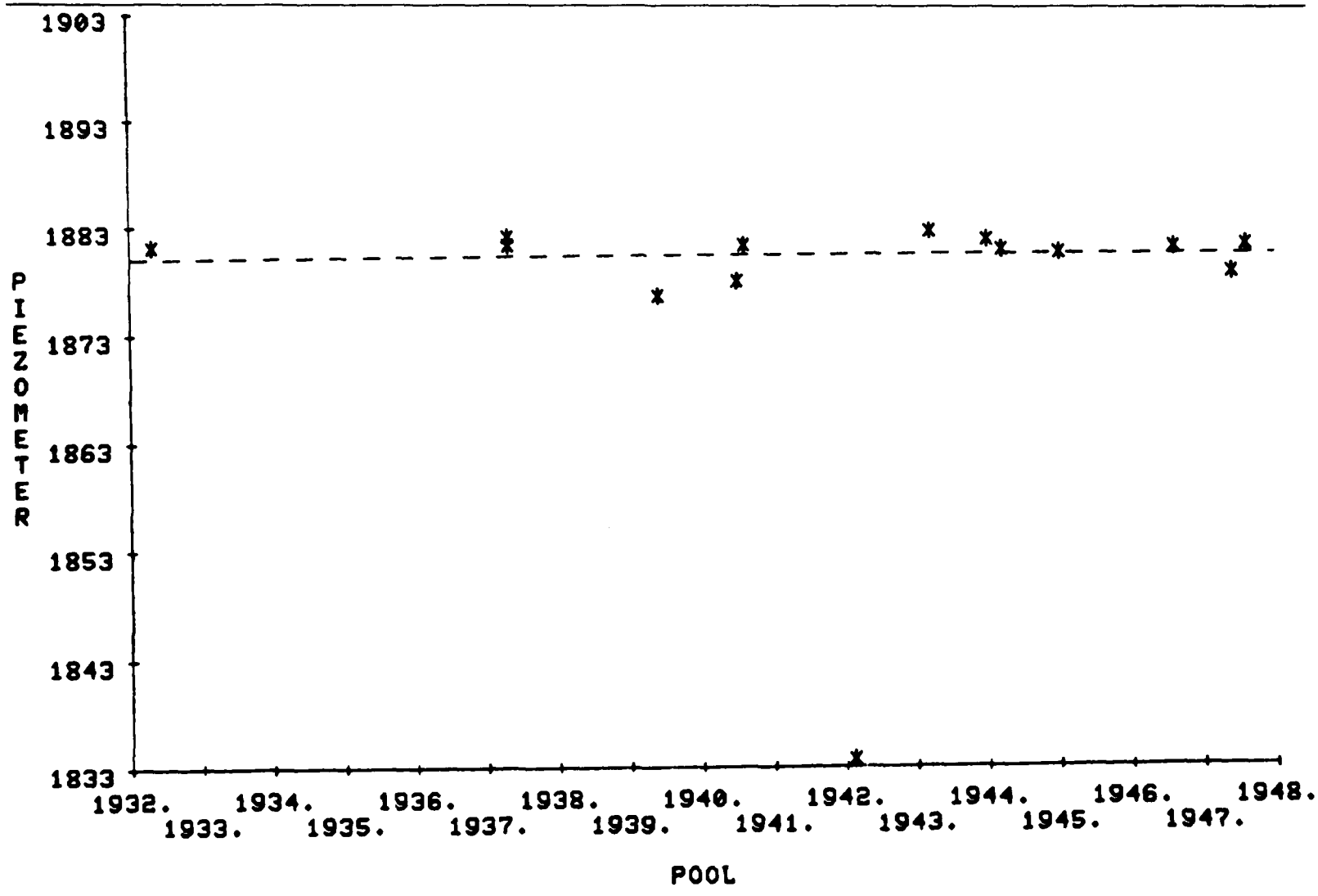
(Continued)

Table 19 (Continued)

```
  NUMBER OF LINES TO BE ADDED (4 MAX.)
? 1

  INPUT STARTING POINT OF THE LINE (X,Y)
? 1932,1880

  INPUT END-OF-LINE POINT (X,Y)
? 1949,1880
```


(Continued)

Table 19 (Continued)



(Continued)

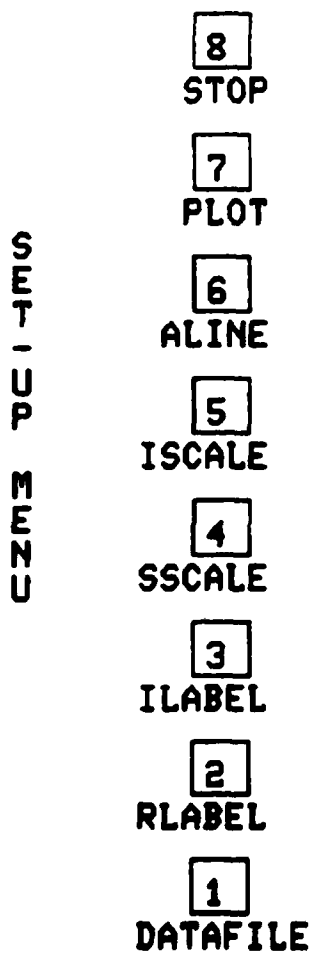
(Sheet 15 of 20)

Table 19 (Continued)

```
 WOULD YOU LIKE TO SELECT SEVERAL OPTIONS AT
 ONE TIME  (Y/N)
? Y
```


(Continued)

Table 19 (Continued)



MULTIPLE OPTIONS ARE SELECTED
TO EXIT, MOVE THE CROSSHAIRS ABOVE BOX 8
AND ENTER A CARRIAGE RETURN ONLY

To continue plotting reselect the initial sequence of 1,3,4, and 7.

The following plot data is from two separate files.

(Continued)

Table 19 (Continued)

```
 NAME OF DATA FILE
? XDATA
         DATE          POOL

    ***


 IS THIS THE BEGINNING OF YOUR DATA (Y/N)
? N
    * 02/28/1974      1946.6


 IS THIS THE BEGINNING OF YOUR DATA (Y/N)
? Y

            1         2         3         4         5
  123456789012345678901234567890123456789012345678901
    * 02/28/1974      1946.6


 INPUT STARTING COLUMN FOR X
? 19

 NUMBER OF CHARACTERS IN X FIELD
? 6

 NUMBER OF CURVES PER PLOT
? 1
```

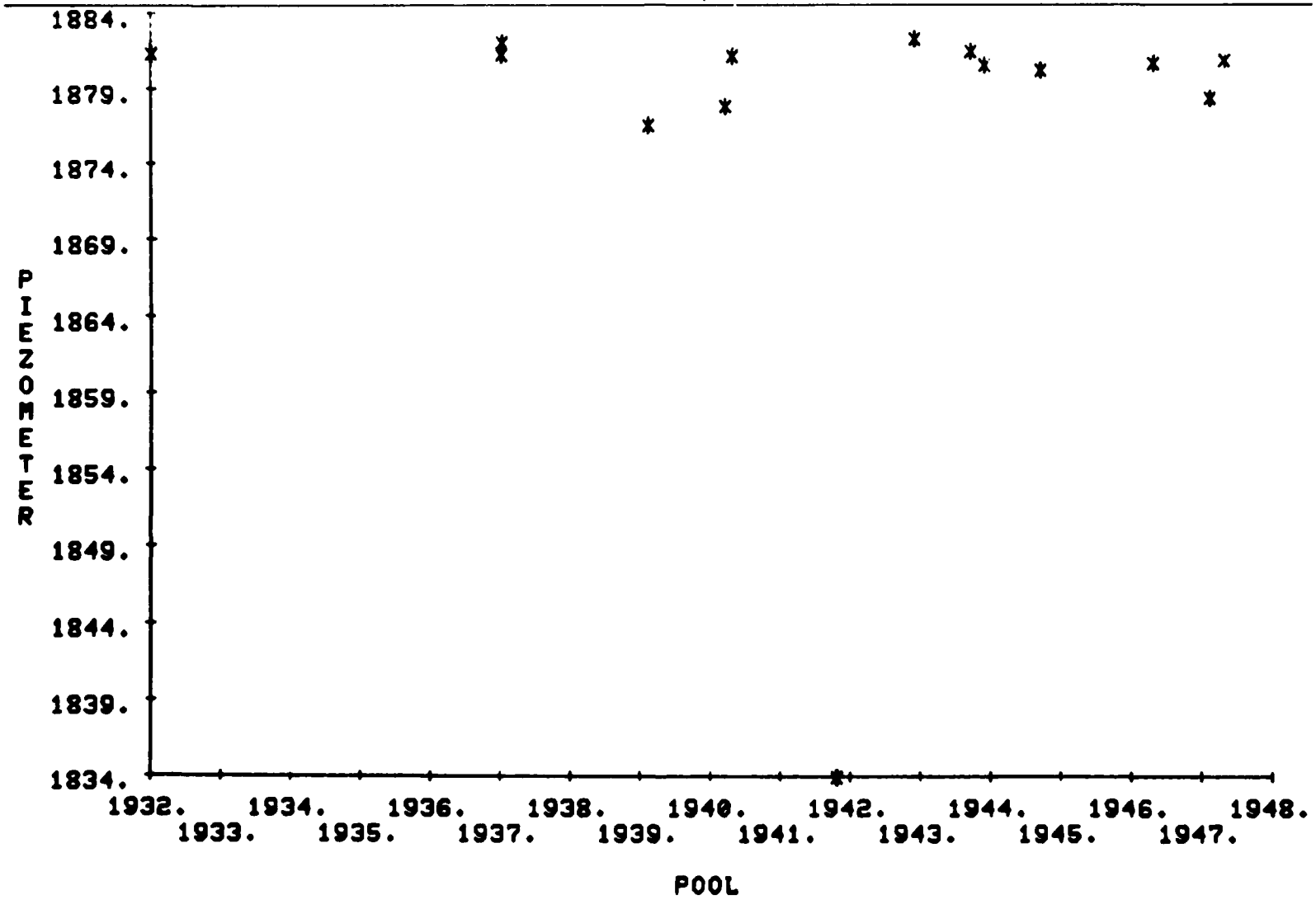
(Continued)

Table 19 (Continued)

```
     CURVE 1
 IS THIS DATA IN SAME DATA FILE (Y/N)
? N
 NAME OF DATA FILE
? YDATA
         DATE                PIEZ

    ***


 IS THIS THE BEGINNING OF YOUR DATA (Y/N)
? N
    * 02/28/1974                1880.7


 IS THIS THE BEGINNING OF YOUR DATA (Y/N)
? Y

            1         2         3         4         5
  12345678901234567890123456789012345678901234567890
    * 02/28/1974                1880.7


 INPUT STARTING COLUMN FOR Y
? 28

 NUMBER OF CHARACTERS IN Y FIELD
? 6

 DO YOU WANT A LINE TO CONNECT DATA POINTS (Y/N)
? N
```

(Continued)

Table 19 (Concluded)



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APPENDIX A

PROCEDURES FOR BACK-UP COPY OF DATA BASE

1. Two procedures are available to back up or copy the data base for reloading in case the data base is damaged. The first procedure creates a permanent report file of the data in the data base and the second automatically creates a binary file when data is loaded to the data base using "UPDPIZB" (batch load command file). The two procedures are described below.

Report File Back Up

2. Enter the data base mode on CDC by typing in -GETDB. After entry to the data base mode, type the following commands.

```
USER,XXX;DBN IS PIEZDB;        (XXX is the user password)

REPORT FILE IS PIEZSV;         (or other file name)

UNLOAD BY CO,CO WH C1 EXISTS OR C1 FAILS;
  (to ensure all data with or without C1 values are unloaded)

EXIT;
```

After exiting the data base mode, save the report file.

```
SAVE,PIEZSV
```

If the data base is damaged later, the data can be reloaded from the permanent file PIEZSV. However, any data loaded after saving PIEZSV would be lost. To reload the data base, the user's data base administrator should be contacted. The advantage of this procedure is that the report file can be saved on a reclaim tape to reduce storage costs.

Batch Binary Back Up

3. The automatic back up on a binary file uses procedures in the UPDPIZB file to create a TAPE999 local file that is saved to a permanent file called PIZTAPE. A copy of the file UPDPIZB is listed below.

```
.PROC,UPDPIZB,DATPIZ.
SUBMIT,JOBFIL,N.
$REVERT.
.DATA,JOBFIL.
/JOB
JOB,CM200000,T2000,P5.
/USER.
/CHARGE.
MAP,OFF.
GET,SUMPIZ.
GET,S2KGET/UN=CECE2K.
GET,DRVPIZ/UN=CEROK2.
GET,DATPIZ.
GET,PIZMODU/UN=CEROK2.
```

```
PIZMODU.
REPLACE,SUMPIZ.
ATTACH,S2K/UN=CECE2K.
S2K,C=INPUT,M=DUMMY,TP.
RENAME,PIZTAPE=TAPE999.
REPLACE,PIZTAPE.
RETURN,TAPE999.
REPLACE,OUTPUT=PIZDAY.
REPLACE,DUMMY.
RETURN,A,S2K.
EXIT.
DAYFILE,ERRLIST.
SAVE,ERRLIST.
/EDR
USER,DLW;DBN IS PIEZDB;
CONTROL;
ECHO ON;
REWIND TAPE999;
SAVE DATA BASE ON TAPE999;
EXIT;
/EOF
```

An alternative is to save the data base while in the data base with the following commands. System 2000 must be called using the TP option as done in procedure file DBSAVE.

```
CONTROL;
SAVE DATA BASE ON TAPE999;
EXIT;
```

After exiting the data base, save the local file TAPE999 to the desired file name.

```
SAVE,TAPE999
RENAME,PIZTAPE=TAPE999
```

To reload a damaged data base, the data base administrator should be contacted. The saved data file cannot be stored on a reclaim tape. However, it requires less disk storage space than the report file back up and is less costly to store on line.

APPENDIX B

USE OF TEXT EDITORS ON CDC AND HARRIS COMPUTER SYSTEMS

Editing Files on CDC

1. Instructions for use of the Corps of Engineers editor or the NOS XEDIT utilities on CED are described below.

a. The NOS system XEDIT (see Cybernet Services, NOS XEDIT, Extended Text Editor, Reference Card, Publication No. 84000 680). Instructions can be obtained by entering the following command.

```
EXPLAIN,XEDIT
```

b. The version of COEDIT on CDC is available during field test period until installation of the final version about 1 November 1985. Information on use of COEDIT is obtained with the following commands.

```
/GET,COEDIT/UN=LIBRARY
/COEDIT,DUMMY
E>HELP,STATUS
(to exit from COEDIT, type QUIT)
```

Editing Files on the Harris Computer

2. On the Harris computer, enter the following command to obtain instructions for the Corps of Engineers editor (COED).

```
DI,*COEDW
```

END

FILMED

2-86

DTIC